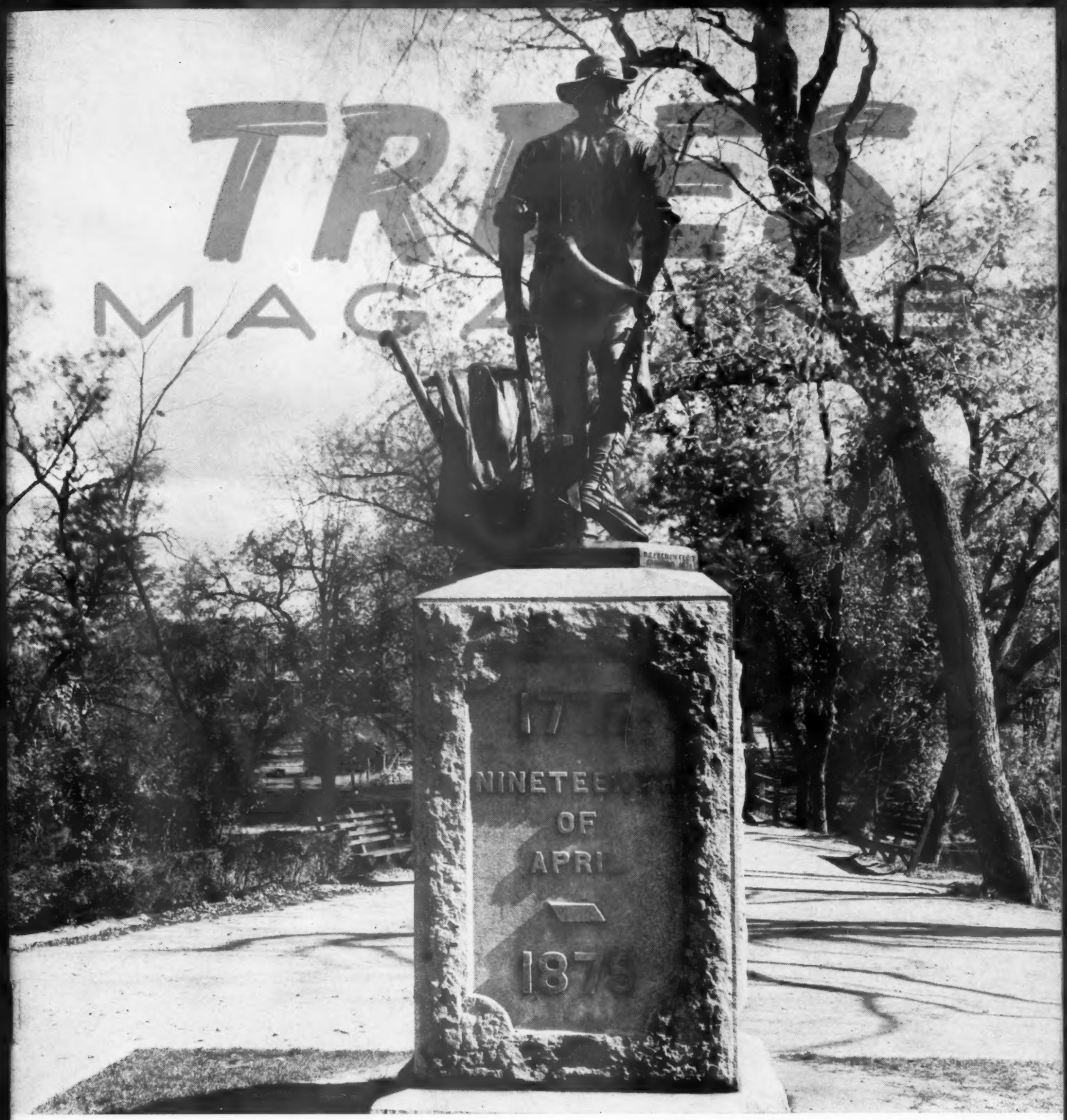


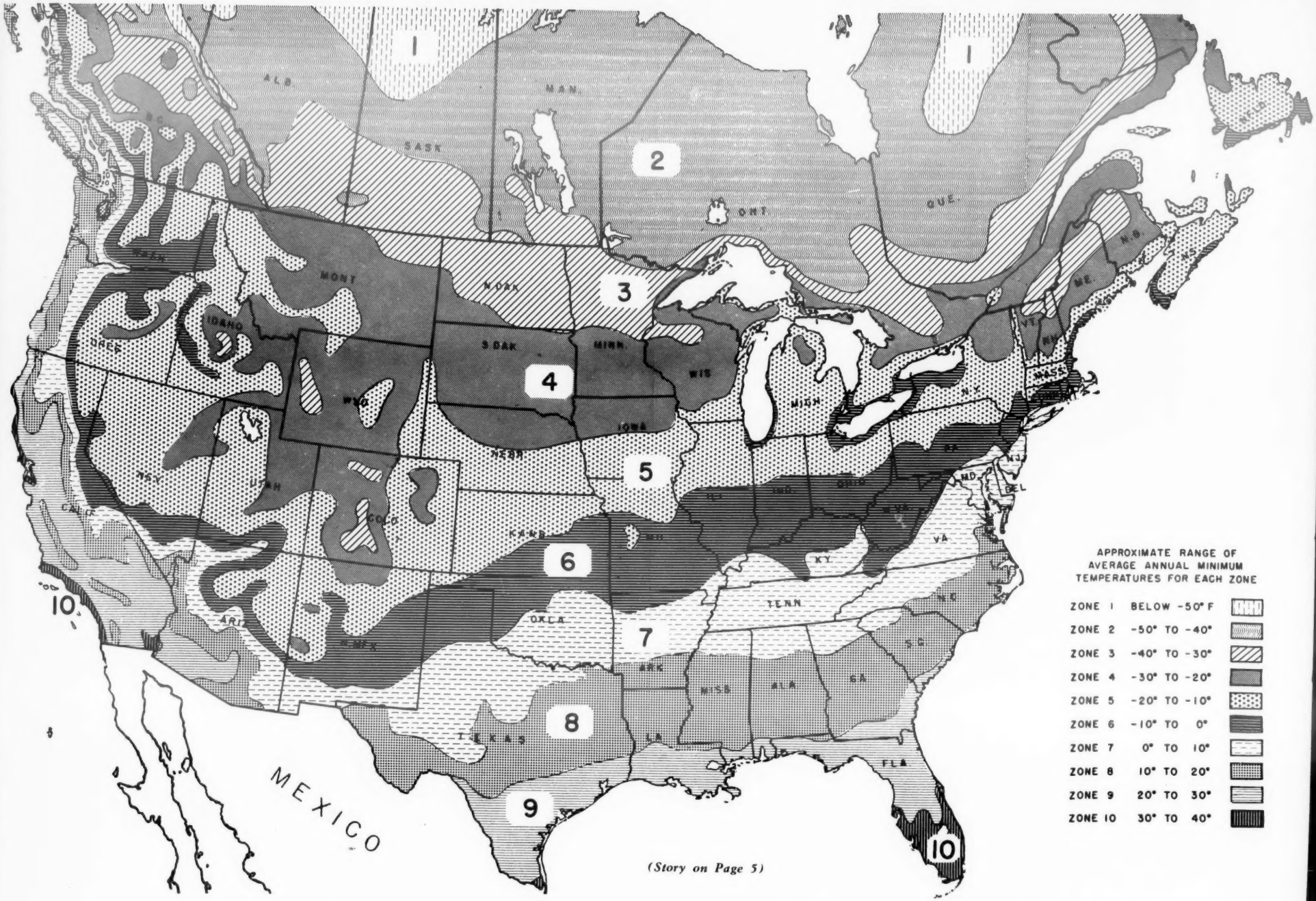
Minute Man Statue at Concord — Scene of "1st Shot That Was Heard 'round the World"

National Shade Tree Conference – Boston, Mass. – August 14-19

The Lawn Makes the Tree King — ***Robert W. Schery***

Leaf Diseases of Shade Trees — ***John L. Weihing***

July-August, 1960 — *The Journal of American Arboriculture* — Vol. 20, No. 5



(Story on Page 5)

BN-6914

ALONG THE WAY With . . . . EDW. SCANLON

■ And SORRY IT IS that I am that the COVER on the LAST ISSUE did not SHOW UP as I had viewed it. Actually the SHEARED LINDENS in front of this hotel are USED TO SHADE a sidewalk cafe. MAYBE I should have SHOT THE PIC from a SIDE ANGLE. Maybe I'll HAVE A CHANCE at ANOTHER PIC THIS SUMMER—I hope.

■ **The MOST COLORFUL ROSE of all TO ME is still MOJAVE. The sunburst red color REMINDS ME of the OLD LOS ANGELES—or maybe it's THE SAME, RENAMED.**

■ The meeting I WILL ATTEND in MELBOURNE, AUSTRALIA Oct. 2-9, I have just learned, is to be called "SHADE TREE CONFERENCE OF 1960." It is sponsored by the ROYAL HORTICULTURAL SOCIETY.

■ **A LOOK AT THE PROGRAM for the 62nd conference of the AMERICAN INSTITUTE OF PARK EXECUTIVES indicates that the RECREATION AND ZOO BOYS have succeeded in SHOVING HORTICULTURE INTO OBLIVION. The meeting will be held in LONG BEACH in Sept.**

■ ISN'T IT ABOUT TIME we STOP TAKING all these insults from TWO-BIT LOUD MOUTHED HOODLUMS the world over and put them in their place—back in the GUTTER where they came from.

■ **Our nice LITTLE MAACKIA (Amurensis) here at the Rancho is ALL DECORATED with HUNDREDS OF FLOWER SPIKES. It's a show when it flowers —in ABOUT TWO WEEKS (Aug. 13). Planted a STREET OF THEM in CLEVELAND about ten years ago and its REALLY NICE. Won't get too big, maybe NO MORE THAN 20 FEET ON STREETS. It has nice MAHOGANY COLORED PEELING BARK and is a tree that SHOULD BE MUCH more widely used. It STOOD OUR BAD '58-'59 winter without a murmur.**

■ Entertained the PARK COMMISSION OF ALTON, ILL., several weeks ago. They visited Cleveland to VIEW STREETS OF DIFFERENT, small trees. Flew up in HERB HELLRUNG's plane. Others in the party were DR. GORDON MOORE, DR. BOB ELLIOT and ED FOWLER. A street of UPRIGHT GOLDEN ELMS (U. carpinifolia Wredei) is making QUITE A SHOW, and a street of JAPANESE LILAC (Syringa japonica (amurense) was IN FLOWER and is a LOVELY SIGHT. They had a REAL ROUGH trip going home and HAD TO LAND in St. Louis.

■ **RAY BURR AND ANN stopped by the Rancho for their ANNUAL VISIT. It's always GOOD TO SEE THEM. RAY was quite SHOCKED to see the WIDESPREAD EVIDENCES of DUTCH ELM DISEASE, particularly in the INACCESSIBLE farm woodlets and wild areas. SUCH SOURCES of infection WILL MAKE CONTROL an ALMOST IMPOSSIBLE ATTAINMENT.**

■ Saw a street of RED HAWS (Crataegus Mollis) WHILE TOURING with the FELLOWS FROM ALTON, that I had ALMOST FORGOTTEN. It was perfect. This is a REAL STREET TREE. Must get some NICE PICTURES for a future issue. NO LEAF TROUBLES—nothing bothers this handsome tree. We had MADE STANDARDS of these trees in our city nursery. They HAD BEEN MULTIPLE stemmed HORRIBLE LOOKING THINGS, but sure TURNED OUT PERFECT. When the fruit ripens it is a BRIGHT RED and it's JUST PLAIN PURTY — good rich foliage color.

■ **WHAT A SUMMER this has been. COLD NIGHTS—down to 49° July 6, and the DAYS IN THE 70's, with OCEANS OF RAIN. Sure is tough on the WEED SITUATION.**

■ WHILE IN ST. LOUIS had dinner with VANCE AND MERLE SHIELD at BUSCHS GROVE—Vance's second home. Heard all about the ROUND THE WORLD TRIP of last fall. MERLE sure picked up a FLOCK OF SOUVENIRS—jewelry, saris and a little BIT OF EVERYTHING.

■ **Finally, AFTER FORGETTING FOR 14 YEARS, I have GATHERED SOME BLOSSOMS of LITTLELEAF LINDEN-According to people from CENTRAL EUROPE it makes a NICE TEA that is supposed to be good for STOMACH AILMENTS— and, regardless is just a PLEASANT, TASTY DRINK. Haven't tried it yet but WILL REPORT LATER —maybe.**

■ The LARRY WACHTEL TRAVELLING FAMILY is really hitting the HIGH SPOTS in EUROPE this summer. They LEFT JUNE 9TH and will return on JULY 20. From the itinerary LARRY SENT they are not going to MISS MUCH—and from the list of hotels they SHOULD BE AUTHORITIES on such abodes. TOO BAD they missed the STORCHEN in ZURICH—I'll be there Aug. 21-22-23. THIS SPOT HAS IT.

■ **JAKIE-BOY THE ROCHESTER GERLING is having a busy time this summer preparing TREE EXHIBITS for THREE OR FOUR MEETINGS. We're sure they will be good—HOW ABOUT SOME PIX of the various ones MAGNIFICENT ONE for the edification of the readers?**

■ It WAS STRANGELY QUIET on the morning of July 11th, at the Rancho. Reason — HEAVY FOG, NO AIRPLANES. Much as I like them it was a RELIEF NOT TO HEAR them trying to crack your ear drums. ONLY LASTED 3 HOURS tho—then back to bedlam.

■ **The NEXT EDITION OF TREES will be ENGINEERED ENTIRELY by our editorial assistant, JUNE FAULDS —that will be the Sept.-Oct. issue—and YOURS TRULY will be lally-gagging AROUND THE WORLD—in 60 days—will try TO SEND IN some dope FOR THIS COLUMN, of tidbits gathered ALONG THE WAY. JUNE IS DOING A GRAND JOB on the mag. and I'm sure YOU WILL LIKE her SOLO EFFORT.**

■ The WEEK OF JULY 11 to 15 TV-WISE was a total, COMPLETE AND IRRETRIEVABLE LOSS — unless of course, you are SO NAIVE as to believe the PIE-IN-THE-SKY promises made by the "BARE-FOOT BOY WITH SHOES ON" nominee. To me it only means MORE TAXES, INFLATION and then to PULL THEIR USUAL MESS out of the red—WAR.

■ **LOOKING FORWARD to seeing NEAL LIMING in NEW DELHI, INDIA. Expect to be there about SEPT. 19. Understand they have done some NICE STREET PLANTING there. Hope it isn't raining, I'm hoping to get some pix OF THE TAJ MAHAL.**

■ Also have SOME PLACES TO SEE in BANGKOK that were suggested BY STEVE O'ROURKE. Should be QUITE A THRILL to see the scenes of so MANY STORIES, such as SAIGON, RANGOON, SINGAPORE and BANGKOK. Will tell you ALL ABOUT IT when I return—ABOUT OCT. 18.

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Vol. 20 Bi-Monthly No. 5

Subscription Price $3.00 Per Year (Foreign $3.50) 60 Cents Per Copy
TREES MAGAZINE
7621 Lewis Road,
Olmsted Falls 38, Ohio

The Editors of TREES invite discussions, comments and all type of literary materials pertaining to trees and tree preservation from any person engaged either in the scientific advancement or commercial development of the field.

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TREES Magazine is a bi-monthly Journal published at Olmsted Falls, Ohio, by Edward H. Scanlon, and is devoted to the advancement of knowledge in the aesthetic and functional uses of exotic and native ornamental trees; to the advancement of research in pathological, entomological and physical disorders of ornamental trees; and to the education of the public to the advantages and need of using trees properly, both aesthetically and functionally. TREES Magazine is dedicated to the furtherance of the technical and business administration of Trees (Street and Ornamental); and Parks (Municipal and National) in the U. S. Scanlon Publishing Co., 7621 Lewis Road, Olmsted Falls, Ohio. Subscription by mail $3.00; outside United States $3.50. Advertising rates upon inquiry. Closing date for advertising copy—10th of month preceding date of issue. Unsolicited manuscripts must be accompanied by return postage.

July-August, 1960 *Journal of the National Arborist Association* Vol. 20, No. 5

Edward H. Scanlon, Editor

7621 Lewis Rd., Olmsted Falls 38, Ohio ADams 5-3314

"No place is complete without trees. A home without trees is charmless; a road without trees is shadeless; a park without trees is purposeless; A COUNTRY WITHOUT TREES IS HOPELESS."

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Out On A Limb

DON'T STAND STILL WITH STREET TREES

We're highly gratified to see the ever increasing trend toward the use of small stature trees, form trees and flowering ones on the nation's streets in spite of the high pressure, never-say-die advertising flooding the country in the cause of the last of the forest giants.

The quarter century crusade carried on by TREES in the face of ridicule, high pressure advertising and sometimes vicious hostility has been recognized, at last, and accepted because of one thing—it makes sense.

Now however, we think the smart city arborists who have turned their back on the old impractical forest giants and fast growing weeds should go one step further—and take the step in one huge stride. It's a dandy.

In our own experience we have had the benefit of the public reaction to small globeheaded trees—to flowering varieties—to columnar and other forms and to foliage variations. In various countries in Europe we have seen the form trees used in combination, and very tastefully combinations of flowering and foliage variations on the same street. It is strikingly handsome and different and should receive widespread recognition and action in this country.

For example, a small residential street in London, just a short distance from the airport was planted to a combination of Blireana plum, then a Pauls Scarlet Thorn, Laburnum Vossi, a Pauls and a Plum. This rotation continued the full length of the street and we were fortunate in obtaining several nice slides. The Pauls and Goldenchain were in bloom and with the purple foliage of the Plum it was really highly decorative and very different.

Another street in Brussels used Lavalle Hawthorn trimmed in a cone shape, while interplanted, at about 50 foot intervals was Crataegus grignonensis, which were pruned in a mushroom form. This was a downtown street and it was spectacular. Of course small globes, pyramids and columnar types are widely used in Holland and other countries and as an increasing number of city arborists are finding out here, people like these different looking trees. In addition they reduce maintenance and conflicts, but what is of greater importance they dress up a street and tell the public that a person with vision and imagination is at the helm.

On Aug. 16th we take off for a round the world trip to look up more advanced examples of tree use. One of the stops will be the city of Algiers. The reason for this venture off the beaten path was prompted by a large picture in a February issue of LIFE. The picture was taken from about the fourth floor of a building looking straight down the main street (showing the barricade during the revolution). The trees lining the

(Continued on Next Page)

EDITORIAL (continued)

street were intriguing. They seemed to be about sixteen feet tall or so and were cut in squares and oblongs. In some places it appeared there were two oblongs together, very few seemed to be regular. A letter to David Schnell of LIFE in Paris, the writer of the story, threw no light on the identity of the trees but we were given several addresses to contact. One letter brought no reply so there seemed to be only one way to whet the curiosity bump — go over and see. So if the old cameras keep clicking we hope to have some good pictures of this interesting street for a future issue of TREES.

We are sure this highly decorative phase of the art of tree use will soon find expression in American streets. The dictates of reduced urban space cry for such treatment while the architectural trend demands it. Let's do it now and not make any more of the old costly mistakes with forest giants.

Editor Ed Scanlon, left, and Vance Shield.

USDA PUBLISHES NEW ZONE HARDINESS MAP

A map of the United States and southern Canada, showing average minimum winter temperatures in ten zones across the continent, has been published by the U. S. Department of Agriculture. It is designed especially to help growers of ornamentals select plants that have sufficient cold hardiness to withstand winter weather in different parts of the country.

Each temperature zone on the map indicates an area in which minimum winter temperatures are within a particular 10-degree range.

The warmest zone, where lowest winter temperatures average 30 to 40 degrees F., cuts across southern Florida, the southern tip of Texas, parts of southern California, and the San Francisco Bay area. The coldest zone shown on the map is in parts of Canada where winter temperatures average lower than 50 degrees F. below zero.

The coldest zone in the United States has a temperature range of minus-30 to minus-40 degrees F. It includes parts of New England and the Northern Plains States, and several small areas in the Rocky Mountains.

The zones appear on the map in different colors, and each is subdivided into darker and lighter shaded areas, representing the warmer and colder 5-degree ranges within each 10-degree zone.

The back of the map contains directions on its use, and also a simplified reduced-scale, black-and-white version of the map for reproduction in books and nursery catalogs. (See front inside cover). A table of representative plants, listed under the coldest zones in which they will normally succeed, is also included.

The map, issued as Miscellaneous Publication No. 814, represents a joint contribution of the National Arboretum of U.S.D.A.'s Agricultural Research Service and the American Horticultural Society and was started as a project of the latter organization (then the American Horticultural Council) in 1953. It was in that year, on recommendation of the American Association of Nurserymen, the American Horticultural Council appointed a Commission to study the several hardiness and plant distribution maps then current with a view to the possible selection of one of them as a standard. Finding none that met requirements in all respects the same Commission was delegated the task of producing a new map to show hardiness or growth zones in relative detail.

After reviewing the many aspects of plant adaptability and the ways in which related portions of the problem had been depicted in the 1936 U.S.D.A. *Atlas of American Agriculture* and elsewhere it was determined that in spite of evident limitations the geographic delineation of average minimum temperatures of this Atlas and of later use in the successful Rehder and Wyman maps of the Arnold Arboretum continued to serve as the best starting point at this stage. As a consequence the new map remains primarily based upon minimum temperature records of the U. S. Weather Bureau and Canada Meteorological Division, going as far back as 1899, as the pattern of these records has been brought reasonably to date and has been reinterpreted in critical areas by cooperating horticulturists.

Problems of publication by the American Horticultural Society were recently resolved by the fortunate circumstance that assistance of the National Arboretum (through the Commission Chairman) entitled it to consideration for printing and distribution through the U. S. Department of Agriculture.

Park Administration Magazine, London, reports that the offer to plant a British lawn in the city of Moscow, as a goodwill gesture, has been refused. The Moscow City Council thanked the Grimsby firm of lawn specialists, Emerald Velvet Ltd., but said the proposal could not be accepted at this time.

Traveling Tree Men Swap Trail Tales

What do two tree men talk about when they meet?

Travel!

In any event that was the subject of discussion between TREES Editor Ed Scanlon and Vance Shield of Shield Tree Service when they met in St. Louis recently.

Vance and his wife Merle returned from a round the world trip earlier this year and Mr. Scanlon will be leaving on a similar trip this month.

"You shouldn't miss the baths in Japan," Merle said laughingly, (if you see her at the NSTC ask for more details), "and you must see the Taj Mahal," Vance insisted.

Before dining in a monkey cage (a screened in cabana type room) at Busch's Grove, Mr. and Mrs. Shield displayed their round the world collection of superb souvenirs — jewelry, saris, spoons, camel skin hasock top, a lovely statuette which was a gift from an Indian official and other things.

Unfortunately, because our editor must complete his trip in 60 days, he will be forced to limit his shopping excursions to pipe, hat and camera bargains while keeping an eye out for new tree varieties suitable for propagation in America.

For Your Calendar

National Shade Tree Conference, Statler Hotel, Boston, Massachusetts, August 14, 15, 16, 17, 18, 19.

Nineteenth Annual short course on Roadside Development, Columbus, Ohio, October 4, 5, 6, 7.

85th annual meeting, American Forestry Association, Edgewater Gulf Hotel, Edgewater Park, Mississippi, October 17, 18, 19.

Ohio Recreation Association Annual Conference, Sheraton-Gibson Hotel, Cincinnati, Ohio, November 2, 3, 4.

Plant Propagators Society, Manger Hotel, Cleveland, Ohio, December 1, 2, 3.

The Lawn Makes The Tree King

By Robert W. Schery, *Director*
The Lawn Institute
Marysville, Ohio

Although arborist's interests are acknowledgedly elevated, let them not overlook the meek legions underfoot. Each tree of home or park is at its majestic best only when adorned by a sparkling vassalage of bluegrass and fine fescue,—or St. Augustine and Zoysias deeper down in Dixie.

The humid lands east of the Mississippi yield primacy to trees. Yet change comes, inordinately speeded by man. Most of the magnificent forest is today, perforce, "prairie." And in the burgeoning suburbs, man insists that trees and grassland live in harmony. A lawn under trees is not so difficult as some think. "Do right" by the grass, and the trees, too, reap benefit (see illustration).

A good seed mixture will contain delicate bluegrasses and lawn fescues as pictured to the left, none of the coarse species such as ryegrass and tall fescue pictured to the right. Look for the required listing on the seed box, and be sure bluegrasses and red fescue varieties predominate. (Photo courtesy Better Lawn & Turf Institute.)

When. For bluegrass-fescue lawnland, from Tennessee-Kansas northward, early autumn is the time to begin. New seedings then, or the bolstering of thin turfs, gain nature's support. So forget man's superimposed calendar year, and make ready this August-September for a really promising start during the cooler months (in the deep South, await spring).

Autumn is kindly to new seedings. The seedbed can be cultivated conveniently then, free from the sogginess it would have in spring, after a winter of replenishing rain. The most vigorous weeds, too, are finished for the year. Yet turfgrasses of quality, the bluegrasses and red fescue varieties, hoard food reserves built of the sunny but cool weather of Autumn. And they sink their roots deeply, become readier for next year's heat and drought. Seeds sprout well, nurtured by the warmth of soils just bidding adieu to summer. The shortening days and cooling temperature reduce evaporation, lessening the water chore, (sprinkling is usually needed to get the grass sprouted quickly). And the other tasks of gardening are less demanding for the lawnsman in autumn.

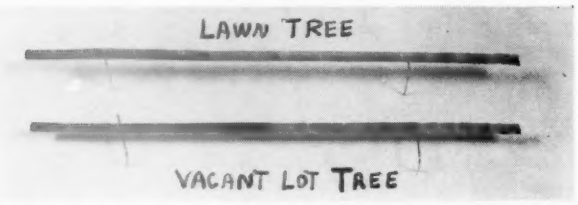
This adds up to a recommendation of "begin at once," if you're to take full advantage of the opportunity for getting a good turf under trees. Life in the shade is not as relaxing for grass as for the lawnsman-in-hammock. Grass sits at the second table when it comes to soil moisture and plant food. So try to have the turf well developed during its favored season, while most trees are dormant; then next summer, as mentioned, grass will be better able to withstand summer hardships.

What. Soils, slope and shade, height of tree crown, and care lavished on the lawn vary so tremendously, that it is impossible to be specific about lawn grasses. The Lawn Institute recommends a recognized quality seed mixture, priprimarily of Kentucky bluegrass and the various red fescue varieties such as come from Oregon. That way there are candidate grasses for quite a variety of local conditions. If not one, then another grass should flourish.

But choose seed mixtures wisely. Avoid those with any appreciable content of fillers or temporary so-called "nursegrasses" such as ryegrass. These usurp nutrients and water, ordinarily meager on a tree-studded lawn. The bluegrasses and red fescues provide suitably varied candidates, especially if unpretentious natural Kentucky bluegrass is included. Natural Kentucky bluegrass is the familiar heterogeneous mixture of "natural varieties," harvested from "wild" sods that have endured in the Midwest through the decades. Mixing in little named bluegrass may enhance the mixture, for attributes in which the varieties excell. Park, for example, sprouts quickly, and Newport has an attractive mixture. Merion is low growing, but is a heavy feeder perhaps at some disadvantage under trees compared to natural Kentucky bluegrass.

The red fescue varieties are all very similar. Good luck has been had with Chewings, Pennlawn, Rainier and Hahee, all grown under careful attention in Oregon. If these varieties are included with the bluegrass, the mixture is assured of a quick-sprouting component that will not be overly competitive, and a type of grass that can endure shade and droughty soils well. Fescue and bluegrass require essentially the same kind of mowing and general care; they are excellent companions in the lawn, complementing each other as they do.

How. Common sense will direct best method of cultivating the soil. If tree roots do not offer too serious difficulty, the soil can be tilled several inches deep,



An example of what lawn-tending will do for a tree is illustrated by the above photographs. A tree on a tended lawn was compared to a similar one on a vacant lot adjacent, both in equivalent position and soil. Lawn attention around the first tree sped its growth to about double that of the vacant lot tree. This is reflected in greatly enhanced terminal growth of the twigs, and especially by the wider annual growth rings of the trunk (shown in the cores, taken by increment borer). From the home owner's viewpoint, a sizable shade tree resulted in half the time that would have been necessary had a lawn not been maintained beneath it. (Photo courtesy Better Lawn & Turf Institute.)

PLANT AMERICA – WISELY

with rotary tiller, tractor-drawn disc, or even hand spading (this is fast becoming an anachronism in the machine age). If soil need not be moved for grading, mix in 10-20 pounds per 1000 square feet, of something like 20-10-5, 10-6-4 or 12-12-12 fertilizer, at time of tillage. If not then, distribute it evenly over the cultivated seedbed, with or just ahead of seeding. The accurate mechanical applicators make short shrift of this job.

The same equipment which distributes fertilizer so accurately can do as much for seed. Seeding rates are generally given on the package, usually about 3 pounds per 1000 square feet, for a mixture high in bluegrass-fescue. Sow half the seed in one direction, the remainder cross-wise, to be sure of no skipped spots. A light dragging, as with a flexible-tine leaf rake, inverted, tumbles seed into soil on seedbeds where the seed remains perched at the surface.

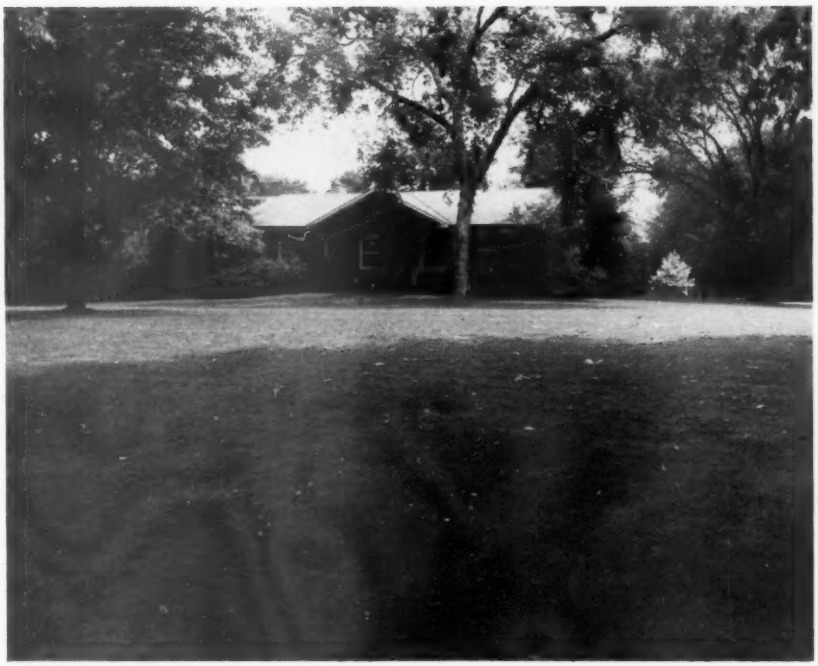
It is not necessary to pulverize the seedbed; as a matter of fact, larger soil chunks (up to golf ball size) make a receptive loose surface for seed. Seedlings emerge around the margins of the sheltering soil chunks, which resist for some time "melting" to an impervious surface, unlike a dusty seedbed which succumbs on first watering.

Good seeding is worth mulching. The mulch not only prevents wash and gullying, but fosters sprouting by helping hold the seedbed humid. Most used mulch is straw, spread a few straws deep. Try to obtain straw free of grain or weed seed. Sphagnum moss, wood chips, pine needles, grass clippings, or other local materials may equally well serve, reduce the need for frequent sprinkling. Or there are manufactured products, such as the Erosionet onion-sack netting, bituminous sprays, or even polyethylene plastic tacked down around the edges to provide a water retaining "greenhouse."

Once sprouting has been initiated, water as soon as the soil dries even a fraction of an inch deep. With ideal moisture a bluegrass-fescue planting should show green in about ten days. This is a litte bit slower than ryegrass but by sowing the bluegrass-fine fescue alone the setback that comes from aggressive ryegrass is avoided. This is occasion to think of the long haul, not quick impression.

Upkeep. Thus far new lawns have been focus of attention. Upkeep, however, applies to both new and established turfs. Chief autumn needs are ferfertilization, and for thin turfs that require upgrading a bolster seeding with quality grass seed. If the sod is very thin, scuff it as best possible, as with a sharp tined rake, or by dragging a disc over the lawn with the disc set straight so as not to turn the sod. Seeds will lodge in the striations and find a chance to strike root sooner or later.

Fertilizers should be high in nitrogen (the first ingredient of the analysis listing, always on the bag in the nitrogen-phosphorus-potassium order). While a good deal of phosphorous was desirable for mixing into the seedbed (phosphorus moves slowly into the root zone from the surface) now nitrogen stimulation of leaf growth is more the need. Fertilizers in which the nitrogen predominates over the phosphorus and potassium, such as 18-8-5, or 12-6-6 would be appropriate. Where ample phosphorus and potash are surely in the soil, nitrogen alone, from urea (44% N), ammonium nitrate 33% N), or ureaform (38% N) serves well.



A good lawn IS possible under trees, enhancing their majesty. One of the most effective practices for maintaining good grass on lawns studded with trees is generous fertilization, especially in autumn, winter and early spring.

Contrary to general impression, fertilizer applied in the cool of autumn is not "lost," even though grass seems to respond little from it then. Bluegrass grows squat late in the year, in response to day length, no matter how much fertilizer is applied. Thus generous feeding in autumn hardly causes extra mowing. Instead the fertility is trapped in the soil and grass, assuring vigorous spring growth. Bluegrass-fescue might well receive both an early and late feeding in autumn—say in September or at time of planting, and again sometime from October to Christmas. Ten pounds per 1000 square feet twice in autumn-winter should perform wonders for the turf. Avoid spreading high rates or dusty fertilizers on young grass; await at least a few mowings before a booster feeding.

The Year Ahead. Planning ahead is part of good lawn management. Considering autumn the beginning of the lawn season, let's anticipate next year. In general, extra consideration in mowing, and a little more frequent attention to the regular lawn practices, should pay particular dividends under trees.

Bluegrass and fescue benefit from high mowing almost anywhere. High may mean as high as 3 inches in the southern part of the bluegrass belt where summers are tough, 1½-2 inches in the northern reaches. Where the intensity of light is cut down by the shade of trees, extra leafage may be especially needed. In the hot middle latitudes, from Kansas across Missouri into Tennessee, shade benefits bluegrass, lowering soil temperatures and permitting this grass to thrive where otherwise summers climate would be a little too rigorous.

For high cutting choose a mower that sets to the required height conveniently. Some old reel mowers would not cut high enough. In general the rotaries, which suck up grass, do a better job of high mowing than do reel mowers.

Grass sometimes can be left unmowed under trees later in the season. But don't let it get so long that it becomes unmanageably floppy. Clippings can usually be left on the lawn, at least with bluegrass and fescue, to sift to the soil where they decompose and recycle their nutrients into new grass. Trailing grasses such as gentgrass, which build up a smothering thatch, might better have clippings collected.

Among the "extras" suggested under trees, feeding is paramount. Stepped up applications rather than double rates are suggested, to be certain that there is

(Continued on Page 29)

36th National Shade Tree C

Headquarters In Statler-Hilton Hotel, Boston, Mass.

Meetings, discussions, exhibits, tours, an opportunity to see old acquaintances and make new friends—that's what the 36th annual National Shade Tree Conference will offer its membership in Boston, August 14-19.

Karl F. Amalia of Manchester, Mass., is the general chairman, assisted by Daniel W. Warren Jr., of Brookline, Mass. as vice chairman. Jack Kenealy, president, will preside at all meetings.

The convention program follows with the exception of the Ladies and Youth Programs which were not available at press time.

PROGRAM

All meetings are in the Ballroom, unless otherwise noted. Eastern Daylight Time.

SUNDAY, AUGUST 14

P. M.
12:00-
5:00—Registration—Mezzanine
2:00—Executive Committee Meeting—Hancock Room
6:30—Executive Committee Dinner—Hancock Room

Evening
8:00—N.A.A. Executive Committee Meeting—Parlor D
8:00—Reception and Hospitality Party—Ballroom Assembly

MONDAY, AUGUST 15

A. M.
8:00—Courtesy Coffee with the Exhibitors
8:30—Registration—Mezzanine
10:30—Opening of the 36th Convention
Call to Order—J. C. Kenealy, National President
Singing—
"Star Spangled Banner"
"God Save the Queen"
Invocation—
Welcome to Boston—
Hon. John F. Collins, Mayor of Boston
Response—J. C. Kenealy, National President
Appointment of Convention Committees
Nominations
Resolutions

11:00—OPPORTUNITIES IN ARBORICULTURE—
Dr. Ray H. Hirt, State University College of Forestry at Syracuse University, Syracuse, N. Y.

P. M.
2:00—SOME OBSERVATIONS ON THE ECOLOGICAL ADAPTATIONS OF TREES
Dr. John W. Neill, Division of Plant Science, The University of British Columbia, Vancouver, Canada

3:00—PLANTING AND MAINTENANCE OF TREES IN TUBS IN CITY AREAS.
Walter I. Meyers, Deputy Superintendent, Department of Parks and Recreation, Detroit, Mich.

Meetings like the one above were held frequently by committee chairmen during the past year to assure a successful and well planned conference for 1960. Standing left to right are: Henry Gilbertson, educational exhibit; Gordon King, properties; and John Lewis, trade exhibit. Seated, left to right are: Harold F. Pomeroy, utility program; Orville Spicer, advisory; L. C. Chadwick, NSTC secretary; Karl F. Amalia, general chairman; Mrs. Temperance Oaks Guptill, youth program; and Daniel W. Warren Jr., vice chairman.

4:00—A PROGRESSIVE APPROACH TO PLANTING HIGHWAY ROADSIDES
Joseph L. Beasley, Highway Landscape Supervisor, Massachusetts Department of Public Works, Arlington, Mass.

Evening
Open Evening

TUESDAY, AUGUST 16

A. M.
7:30—Past Presidents Breakfast—Hancock Room

8:00—Courtesy Coffee with the Exhibitors

8:30—Registration—Mezzanine

9:30—WHAT'S AHEAD IN BUSINESS FOR THE NEXT DECADE?
Dr. James W. Kelley, College of Business Administration, Boston University, Boston, Mass.

10:30—BUSINESS SESSION—Open to all members.
National President, J. C. Kenealy, presiding. Meeting in the Ballroom Assembly.
Roll Call of Members of Board of Governors
Nominations and Election of Executive Committee Members from Regions 5 and 7 for terms of 3 years.
Nominations and Election of Membership Committee Members from Regions 1 and 4.
Report of the Executive Committee—L. C. Chadwick, Secretary, National Shade Tree Conference, Columbus, Ohio.
Report of the Budget Committee—Paul E. Tilford, Chairman, Executive Secretary, National Arborists Association, Wooster, Ohio.
Report of the Secretary—L. C. Chadwick, Dept. of Horticulture, Ohio State University, Columbus, Ohio.
Report of the Treasurer — L. C. Chadwick, Dept. of Horticulture, Ohio State University, Columbus, Ohio.
Report of the Editor—Paul E. Tilford, Executive Secretary, National Arborists Association, Wooster, Ohio.
Old Business
New Business

12 Noon—Keynote Luncheon—Ballroom
Invocation
Address

SPLIT SESSIONS

P. M.
2:00—SECTION 1—National Arborists Association Meeting—
President James Turner, Presiding
Ballroom Assembly
WAGE AND HOUR LAW: ITS APPLICATION TO THE TREE-CARE INDUSTRY—James Nelson, Deputy Regional Director, U. S. Dept. of Labor, Boston, Mass.
CYTOSPORE CANKER CONTROL—Henry F. Davis, III, Lowden Specialists, Needham, Mass.
CHEMICALS, EQUIPMENT AND TECHNIQUES FOR CONTROL OF WEEDS—William C. Hall, Arboreal Associates, Harriman, New York
BUSINESS MEETING FOR MEMBERS of the National Arborist Association

Evening—National Arborists Association Dinner—Bay State Room

P. M.
6:00—Cocktail Hour
7:00—Dinner
Induction of new officers
Presentation of Safety Awards
A Woman's View of Russia (Illustrated), Ann Wood, Assistant to the President, Northeast Airlines, Boston, Mass.

P. M.
2:00—SECTION 2—MUNICIPAL ARBORICULTURE—For Municipal Arborists, City Foresters, Shade

Conference — August 14 — 19

Tree Commissioners, Park Superintendents and others. Program arranged by the Municipal Arborists Committee, Carl J. Schiff, Director of Horticulture, Dept. of Parks, New York City, N. Y., Chairman

MEETING IN THE BALLROOM

2:00—INTRODUCTORY REMARKS—Carl J. Schiff, Chairman, Municipal Arborists Committee

2:10—AVAILABILITY AND SUITABILITY OF SEVERAL TREE SPECIES AND THEIR CLONES FOR LAWN AND STREET PLANTING — Jake Gerling, Dept. of Parks, Rochester, N. Y.

3:10—ORGANIZATION, EQUIPMENT AND MANAGEMENT OF STREET TREE CREWS — John Michalko, Div. of Shade Trees, Cleveland, Ohio

4:10—DISCUSSION OF ABOVE SUBJECTS

5:00—SHADE TREE GIMMICKS AND PROBLEM SLIDES FOR THE MUNICIPAL ARBORIST—Moderator—Carl J. Schiff

Evening

6:30—National Arborists Association Dinner—Bay State Room

PLANTING STREET TREES IN CURB EXCAVATIONS IN CITY AREAS—Edward F. Brarman, Jr., Supt. of Parks and Shade Trees, Englood, N. J.

WEDNESDAY, AUGUST 17

A. M.

8:00—New England Early Bird Breakfast —Ballroom

Invocation

Entertainment and Singing

Remarks by National President—J. C. Kenealy

Address—SIGNERY OR SCENERY —Mrs. E. Sohier Welch, Chairman Massachusetts Roadside Council

10:15—MEMORIAL PROGRAM—for past Presidents—Ed. Higgins and C. C. Hamilton—In charge of a committee of Past Presidents, Karl Dressel, Chairman

PLANTING OF A MEMORIAL TREE

11:00—Buses leave Statler Hilton for Franklin Park, Jamaica Plain, and Commercial Equipment Demonstrations

12:00—Outdoor Buffet Lunch

P. M.

1:00—Commercial Equipment Demonstrations

4:30—Buses return to Statler Hilton Hotel

Evening—Functions Available

Trip on Charles River to Art Festival Shakesperian Theatre

Baseball Game—New York Yankees vs. Boston Red Sox

THURSDAY, AUGUST 18

A. M.

8:00—Courtesy Coffee with the Exhibitors

8:30—Registration—Mezzanine

9:30—PUBLIC UTILITY ARBORICULTURE

Program arranged by the Public Utility Arborists Committee—C. E. Lee, Southern California Edison Co., Ltd., Los Angeles, California, Chairman

Chairman—Harold L. Pomeroy, Superintendent of Operations, Northern Division, Western Massachusetts Electric Company, Turners Falls, Mass.

ARBORICULTURE ACTIVITIES OF THE EDISON ELECTRIC INSTITUTE—R. Hicock, Operation Superintendent, Connecticut Light & Power Company, Hartford, Conn.

UTILITY HELICOPTER SPRAYING—Leonard Donahue, Superintendent of Construction, Central Vermont Public Service Corporation, Rutland, Vermont.

THE VALUE OF A MEMBERSHIP IN THE NATIONAL SHADE TREE CONFERENCE TO A UTILITY COMPANY
J. C. Kenealy, President, National Shade Tree Conference

P. M.

VISIT THE COMMERCIAL EXHIBITORS

1:30—Business Session—Open to all members. National President, J. C. Kenealy, presiding

Roll Call of Members of Board of Governors

STANDING COMMITTEE REPORTS

NOMENCLATURE AND STANDARDS COMMITTEE—Dr. Richard F. Campana, Dept. of Plant Pathology, University of Maine, Orono, Maine

MEMORIAL RESEARCH FUND COMMITTEE—Dr. Paul E. Tilford, Executive Secretary, National Arborists Association, Wooster, O.

SLIDE LIBRARY COMMITTEE —Dr. S. H. Davis, Jr., Dept. of Plant Pathology, Rutgers University, New Brunswick, N. J.

PUBLIC UTILITY ARBORISTS COMMITTEE—C. E. Lee, Southern Calif. Edison Co., Ltd., Los Angeles, Calif.

SHADE TREE SELECTION COMMITTEE—Jake Gerling, Dept. of Parks, Rochester, N. Y.

SHADE TREE EVALUATION COMMITTEE — Norman Armstrong, Chapel Hill, No. Carolina

MUNICIPAL ARBORISTS COMMITTEE—Carl J. Schiff, Director of Horticulture, Dept. of Parks, New York City.

ARBORICULTURE FILM COMMITTEE—
PRODUCTION—Noel B. Wysong, Cook County Forest Preserve, River Forest, Ill.
FUNDS—F. Earle Martin, Cedarvale Tree Experts, Ltd., Toronto, Ontario, Canada

ETHICS AND STANDARDS OF PRACTICE COMMITTEE—Keith L. Davey, Davey Tree Surgery Co., Ltd., San Francisco, California

MEMBERSHIP CLASSIFICATION COMMITTEE—Wilfrid Wheeler, Jr., Bartlett Tree Expert Co., Cambridge, Mass.

REALIGNMENT OF REGIONAL BOUNDARIES COMMITTEE—George Lewis, Lewis Tree Surgeons, Media, Pa.

NEW CHAPTERS — D. W. Wade, Wade Tree Expert Service, Chappagua, N. Y.

Statler's Chef Orders NSTC Banquet Food

Have you ever wondered about the amount of food supplies required for a banquet?

TREES has. The result: a market list for the forthcoming NSTC annual banquet, as prepared by Vasil Karoli, chief chef at the Statler Hilton Hotel, Boston.

Market List

Fruit cocktail	100 gals.
Clam chowder	50 gals.
Fillet mignon	1000 lbs.
Potatoes	500 lbs.
Broccoli polonaise	250 lbs.
Tossed salad	150 heads of lettuce, 150 heads of chicory, 150 heads of romaine, 100 lbs. of tomatoes, 84 qts or 21 gals. dressing
Rolls	2500
Butter	100 lbs.
Olives	60 gals.
Radishes	5 boxes
Celery	10 crates
Sherbert	100 gals.
Coffee	125 gals.
Sugar	125 lbs.
Cream, heavy, 38%	10 gals

Mr. Karoli, better known as Chef Billy, has been a chef for 26 years. He has been employed by the Statler chain throughout that time except for the years he served with the American forces as hospital cook.

He was assistant chef at the Statler Hilton Hotel in Washington, D. C. and personally prepared yogert for President Truman.

Several New England surprise dishes are being prepared by Chef Billy and the NSTC Food Committee . . . bring your appetite!

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BRANCHES OF THE LAW

By Howard Newcomb Morse

Counsellor at Law of the Supreme Court of the United States of America
"Can the Planting of Trees Constitute Interstate Commerce?"

The Phoenix Nursery Company was an Illinois corporation or place of business in Wisconsin. It never complied with a Wisconsin law prescribing the conditions on which a foreign corporation might secure a license to transact business in that State.. It entered into a written contract with Albert O. Trostel, of Milwaukee, Wisconsin, whereby it agreed to sell him certain trees then in its nursery at Bloomington at a specified price, and plant the strees upon Trostel's premises in Milwaukee according to the plans and directions of Trostel's landscape architect. It also agreed to replace any trees not in healthy condition by the following spring if the trees had been properly taken care of by an experienced gardener.

After the trees arrived at Trostel's premises, he objected to their quality, and it was then agreed that they should be planted and Trostel should pay their reasonable market value instead of the contract price. It was further agreed that Trostel might order additional trees at prices named in a list submitted him, which he did to a stipulated amount.

Trostel did not pay, so Phoenix brought an action in the Circuit Court of Milwaukee County, Wisconsin, to recover from Trostel the cost of the trees and the planting of them. Trostel defended on the ground that since Phoenix was a foreign corporation and had not become domesticated in Wisconsin it could not enforce the contract against him.

The court held the contract enforceable because transactions between the parties constituted interestate commerce exempting Phoenix, as a foreign corporation, from having to have been domesticated in Wisconsin in order to be able to enforce the contract and thereby collect from Trostel. Accordingly, the court rendered judgment for Phoenix, and Trostel appealed. Counsel for Phoenix argued that Trostel should not be permitted to reap the benefits of his contract and then be relieved from its burden.

The Supreme Court of Wisconsin reversed the decision of the court below. The Supreme Court ruled that Phoenix, because it had not become domesticated in Wisconsin in order to do business in that State, could not recover the cost of the trees and the planting of them. The Court reasoned that the planting of the trees was a business wholly separate from interstate commerce and a mere local act after interstate commerce was completely terminated.

The Court declared: ". . . the planting of . . . trees is not essential . . . to their sale and delivery . . . We fully concur in the view called to our attention by counsel for plaintiff (Phoenix) that courts should not without good cause permit parties to reap the benefits of their contracts and then be relieved from their burden. Where, however, a constitutional legislative declaration is explicit in declaring a prohibited contract void, and the case is clearly within the prohibition, courts have but one course to pursue, and that is to enforce the statue."

The Tumblebug & Scarab Beetle

The mention of Tumblebugs calls up childhood memories. After school let out in spring, one of the chores of a farm youngster was herding the family cows while they ate grass on the roadside. He had nothing to do except turn the cattle around before they strayed too far and see that they did not break through fences. However, he had to stay on the job, alone, because our fathers went on the principle, "One boy is a boy, two boys —half a boy, and three boys—no boy at all." Passing wagons, buggies and, rarely, a chugging automobile added momentary interest. With such limited sources of amusement, it is not surprising that many of us became Tumblebug watchers.

A "tumblebug" is a beetle, not a true bug. It is a nickname for those kinds of Dung Beetles which mold, roll away, and bury balls of dung on which they feed. In some they lay eggs and rear their young. The best-known kinds are those which make ball from fresh cow or horse manure. Other species roll the ready-made, pellet-like droppings of rabbits, sheep and deer. Since these balls are often rolled considerable distances over grass and bumpy ground, both ball and beetle take many a tumble.

The tumblebug is built like a bulldozer—a big, black, robust insect with stout legs fitted for digging and a blunt shovel-like beak used in shaping the ball. In rolling, its "marble" the beetle faces backward and almost stands on its head as it pushes with the hind legs while the forelegs are braced against the ground. These balls are rolled, buried and eaten, one after another, until late summer when the female buries a few special pear-shaped balls in each of which she lays a large creamy white egg. From this egg hatches a C-shaped grub, or larva, which feeds and grows until the ball is a hollow shell. After passing through a resting, or pupa stage, the new adult tumblebug breaks out, usually after a rain, and digs its way to the surface.

The Sacred Scarab of the ancient Egyptians is a dung beetle of the Mediter-

(Continued on Page 25)

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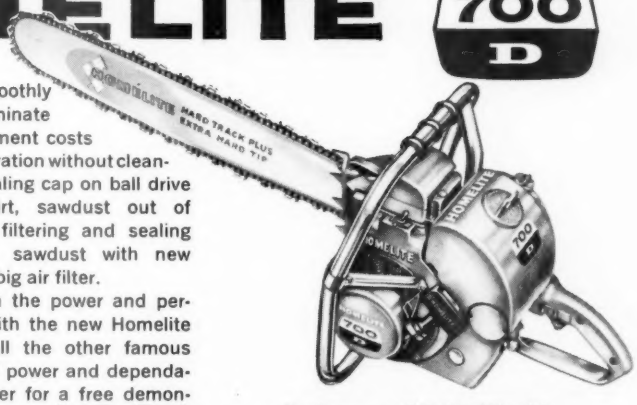

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LEAF DISEASES OF SHADE TREES

By John L. Weihing

Extension Plant Pathologist
University of Nebraska
Presented at the Midwest Chapter of the National Shade Tree Conference February 11, 1960, Omaha, Nebraska

The real damage caused by leaf diseases of our present day shade trees is usually more in the way of a loss from aesthetic value rather than permanent damage to the tree. Of course, among shade trees the loss of aesthetic value is very important since they are grown for that purpose. Rarely is a leaf disease the cause of death of a tree. However, extensive defoliation over a period of successive years would cause such a drain on food reserves as to result in death.

When leaves are lost during summertime the secondary buds break and new leaves form, there is required a considerable amount of stored food and reserves to get the newly forming leaves grown to the stage where they are producing enough food through photosynthesis to handle their own requirements and also to begin to replenish the food supply. The drain on food reserves may be so heavy for the initiation of the second group of leaves that it is not possible for them to replenish the depleted reserves before fall. The tree goes into the winter with a low food reserve and it must be remembered that trees are alive in the winter and that they do expend energy. This energy is obtained from the use of the food reserves.

In the spring the formation of the new leaves will further drain upon the stored reserves. If these reserves are small, the new group of leaves will necessarily be quite small. This cuts down upon the area for photosynthesis which in turn is cutting down on the industrial capacities of the tree to build up further food reserves for the on-coming year. It would take several years for a tree to get back into full gear after it has had a serious setback in depletion of food reserves.

Now let us take for instance a set of factors which cause the leaves to be lost in July or August for several years in succession. This means that the food reserves used for the initiation of the second set of leaves is going to be greater than the production of food reserves. Each year the tree goes into the winter with a less and less food reserve. Eventually this reserve may become so low that the tree is incapable of living through the winter.

Another added feature regarding the depletion of food reserves is that the tree may be weakened to the state that parasites would be able to attack it which would otherwise be unable to gain entry if it were a strong, vigorous, healthy tree. These parasites may be such things as root rots which would cut down on the capacity of the tree to obtain food and water. It may be that insects such as borers would be able to gain entry into the trunk and limbs due to the weakened condition. These factors would further multiply the problems of the tree and hasten it toward death.

CAUSE OF LEAF DISEASES

Most of the leaf diseases of shade trees are caused by certain fungi, each disease being caused by a specific fungus. Occasionally, there are some bacteria that can attack the leaves of certain species but as a whole they are of relatively minor importance and we shall not deal with them today. I will simply mention that the disease fire blight, which is so prevalent in the rose family, i.e., apple, pear, quince, hawthorne and others, is caused by a bacterium and this particular organism will attack leaves. However, it will attack all portions of the upper part of the plant so I do not consider it as a distinct leaf disease and therefore will not embrace it in our discussion today.

We are all familiar with fungi one way or another. There are many thousands of kinds of fungi or molds, however you wish to call them. Most of them are beneficial to us. However, when a particular mold is capable of attacking a living organism such as a tree and causing death of particular parts of that tree or all of it then we consider it as detrimental. This detrimental association is spoken of as disease.

The fungi are actually living plants. But they differ from the big green plants that we see in our every day life in that they do not have the leaves containing the green substance chlorophyll. Without this chlorophyll they are incapable of manufacturing their own food from carbon dioxide, water and mineral elements as do the green plants. They must obtain their food by living upon either dead matter or, in specific cases, upon living matter, thus causing disease.

The body of the fungi is very much thread-like. The thread-like elements are too small to be seen with the naked eye. The fungi have the capacity to produce the thread-like elements in abundance and can build up a tremendous amount which we do see as fluffy mold-like growths that may be white, green, orange, or various other colors. The body of the fungus does not have roots like those of the green plants. In fact, in some instances all of the elements of the fungus may act pretty much as the roots. These elements may give off various substances (enzymes) that cause the dissolution of organic matter upon which they are growing causing it to break down into simpler components. These simple components are then absorbed into the body of the thread-like elements where they are used for further energy and growth.

The fungi have the capacity to reproduce as do all living organisms here on earth. In fact, they may have reproduction processes that have a fantastic capacity to produce seed-like organs which are called spores. A fungus may not have to have sexuality for the production of these spores, although sexuality is common among the fungi and does play a very important part through hybridization which is necessary for the maintenance of its survival on earth.

I have led you into this academic discussion of fungi so as to emphasize the fact that these leaf diseases are caused by living organisms. The general principles by which these living organims live here on earth are the same as those of the tree of which they attack. They must have food and water, the same as a tree, for energy, growth and reproduction. And they, too, must have variability within their species, the same as trees. So I want to fix firmly in your minds that as we speak about these leaf diseases we are discussing the association of two living entities; one being parasitic upon the other; and that as we battle against the cause of a disease we are not battling against an inert dust-like enemy but against one of Nature's own entities. And I assure you that Nature is a most admirable adversary.

TYPES OF LEAF DISEASES

For the purpose of discussion we can classify leaf diseases into four distinct classes based on symptoms: 1) leaf spot or blotch type, 2) leaf blister or curl type, 3) powdery mildew type, and 4) the rust type.

Leaf spot or blotch is characterized by the appearance of dead areas on the leaves which in some cases may be round or irregular in shape and vary considerably in size. Usually each disease agency will cause a distinctive type of symptom. Take for instance the fungus which is called *Gnomonia ulmea*. This organism attacks elm leaves and causes the characteristic black spot to develop.

There are some leaf attacking organisms that cause irregular dead areas that are usually of considerable size. This type of symptom is commonly termed blotch. A common example is anthracnose of ash which sometimes becomes a serious defoliating disease during wet springs.

There is no clear cut distinction whether a disease will be called a leaf spot or blotch. Usually the term that is used is the one which was originally given by the scientist first to describe the disease. If it looked more like a spot rather than a blotch symptom to him, then that is what he called it.

The leaf spot and blotch diseases are caused by fungi that all have a very simi-

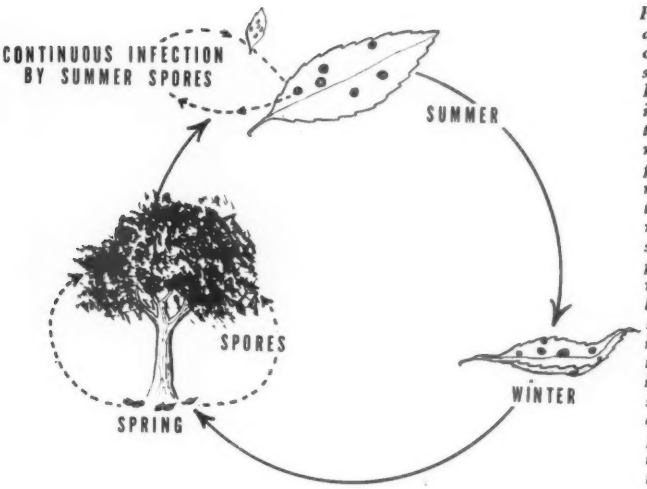

Figure 1—A generalization of the life cycle of the leaf spot and blotch Fungi. The dead infected leaves fall to the ground where the disease producing fungus remains alive throughout the winter. In the spring the fungus produces spores which by chance land on the new spring foliage causing infection. Further infection during spring and summer may occur from spores produced from the initially infected tissue.

lar life cycle (see Figure 1). The fungus passes the winter in the dead tissues of infected leaves. It is usually here that the sexuality of the organism occurs but we will not go into that detail here today. The principle thing that we are interested in is the fact that in the spring spores are formed (in some cases they are sexual spores, in some cases asexual or both), and these are carried aloft by air currents where some fall upon the newly formed leaves. In the presence of moisture the spore germinates, producing a tube that penetrates into the leaf. Once inside the leaf the parasite has an ideal home—all of the food and moisture it needs and protection from outside hazards. Here it grows, permeating the cellular structure with its thread-like filaments which literally suck the life from the tissues.

After completing its destructive sojourn it will probably devote its capacities to producing a new crop of spores and for every spore that produces an infection, it may be that 1000 or more spores will again be produced and released to be spread by the wind and rain. How these spores are produced vary from fungus to fungus just as are the seed of trees. Some produce their spores in cup-like or pan-like arrangements. Those of you who are familiar with the Anthracnose disease, which produces a blotch type of symptom, have this type of spore producing structure. Some fungi form their spores within a sac, some on little pedicels that arise out of the surface of the leaf and some on branched-like structures atop the leaf. It doesn't really matter in what type of structure a fungus produces its spores (except for classification and study by scientists) the main thing is that all are very much effective in doing their job—that is, producing spores.

Control of leaf spots and blotch: Now that we have looked over the characteristics of these fungi, I would like to point out some particularly salient features which are important for their control: 1) each of them produce spores that are carried by air currents and land by chance onto the leaves of trees; 2) it is necessary that moisture be present on the surface of the leaves for the spores to germinate, put out a tube, and to penetrate into the leaf. Now this leads to a very interesting aspect with regard to chemical control. If the surface of the leaf is covered with a material which is toxic to the spore when it starts to germinate, it will kill that spore and infection does not occur. It is on this principle that the fungicides are used for the control of leaf diseases of trees. For control it is thus necessary to apply a chemical that 1) will be toxic to the particular germinating fungus spore, 2) will not be toxic to the tree, and 3) must be placed upon the leaves of the tree before infection occurs because once the fungus is inside, the protective fungicide can not get to it and kill it. Thus it is most desirable to know the life characteristics of the fungus causing the disease which we are going to attempt to control. Take for instance, if the fungus is a type that emits its spores in greatest abundance in the spring, then the spray application should be made in early spring before the leaves become contaminated by the disease agency spores.

I do not have the time here today to take up the individual characteristics of each of the fungi causing leaf diseases. There are several excellent applied books to which you can refer such as Pirone's "Maintenance of Shade and Ornamental Trees" or Westcott's "Plant Disease Handbook" or the circulars and bulletins on tree diseases published by state experiment stations and extension services.

There is another aspect of control that I wish to mention and that is the actual removal of the disease from the area—that is cleaning up and burning the infected leaves. This may assist in specific isolated cases but you must remember that the disease spores are airborne and therefore can be blown in from nearby areas.

Regarding suggested chemicals for control of leaf spot and blotch diseases, old Bordeaux 8-8-100 has been the standard, and an excellent one too, for many years. Some experiment stations are now beginning to recommend for certain leaf diseases some of the newer fungicides such as Phenyl mercury (example: Puratized Agricultural Spray), Zineb, Maneb and Ferbam. (See in particular Special Circular 46, *Tree Diseases, Description and Control,* Extension Service, Penn. State University—Written by Lester P. Nichols).

Leaf blister or curl type of leaf disease is really more common to you as a type of a disease of peaches or plums. However this type of disease does occur among the shade trees, particularly in maple, oak and poplar. It is characterized by a blistering and curling of the leaves.

This type of disease is caused by a distinctive group of fungi that produce their spore crop between the leaf cuticle and epidermis on the upper surface of the leaf. Below the surface the fungus grows among the cells resulting in their abnormal development and behavior.

The surface spores are carried off by wind and rain where they by chance land on the branches, twigs and newly forming buds. They reside here until the next spring or perhaps until the second spring if weather conditions do not favor their germination. Then when the bud begins to unfold and if there is free moisture from rain or dew the spores germinate and those which come in contact with the newly forming leaves cause infection.

Control of leaf blister or curl: This type of disease can easily be controlled by one dormant spray of lime-sulfur, or Zineb 65% WP (1½ lbs.) or Captan 50% WP (2 lbs. per 100 gallons of spray). Only one dormant spray is necessary because the spores are mostly on the surface of the tree.

Powdery mildew disease is common to most broad leaf trees but rarely is it of economic importance. It is easily recognizable in that it appears as a white, powdery or milk-like substance on the surface of the leaves. It can cause considerable leaf distortion and death.

The powdery mildew fungus forms on the leaf surface hard, black, ball-like organs in which spores resulting from sexuality are formed. The ball, known to scientists as a perithecium, is the overwintering stage. In the spring it breaks open, releasing the spores which are wind borne to nearby susceptible leaves. Upon germination the powdery mildew fungus does not disappear down into the leaf tissues as do the leaf spot, blotch or curl inducing fungi but instead it remains on the surface and sends sucker or root-like structures down into the tissues for nourishment. The fungal body on the leaf's

(Continued on Next Page)

surface sends out its filaments in all directions sinking its hungry parasitic roots throughout. The leaf reacts through crinkling and curling and then dies.

Control of Powdery Mildew: The powdery mildew fungus is out in the open and can be readily controlled through spraying although infection has occurred. This is a distinct advantage over the control of the other leaf diseases because they must be sprayed before infection. Why? Because our spray materials are protectants only. Once a fungus is inside the leaf a protectant type fungicide cannot reach it. The parasite is safe and goes about destroying leaf tissue totally uninhibited. But in the case of powdery mildew the spray material will contact the surface elements killing them and thus destroying the fungus as a whole. When necessary, weekly sprays of 95% wettable sulfur (2 lbs. per 100 gallons of spray) will do an excellent job. There are some new fungicides such as Karathane and Mildex that have been developed specifically for mildew and these, too, do an excellent control job.

Rust diseases occasionally become a problem of certain shade trees, particularly Hawthorne. The rusts are characterized by causing leaf spots which contain a dust-like material that varies in color from yellowish orange to brick red, depending upon the rust species. The rustry material will rub off onto one's finger as a dust.

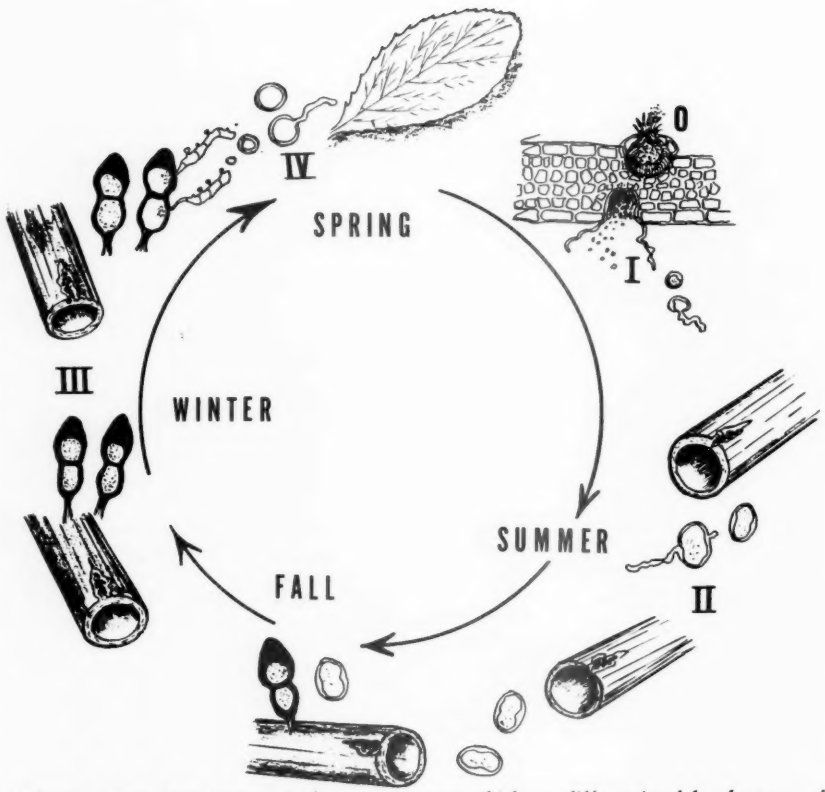

Figure 2—Rust fungi commonly have many stages which are differentiated by the types of spores produced. Also they frequently require two entirely different plant species to complete their life cycle. In this illustration the rust alternates between a broad leaf and a grass host. The Roman numerals are used by scientists as keys to indicate spore stages.

There are actually hundreds of rust species, many of them attacking trees. The rust fungi grow on only living plant tissue. This also is true of the powdery mildew fungi. Most rust fungi have a complicated life history forming many different kinds of spores (Figure 2). They may overwinter on a grass plant as a black spore (Teliospore III) which germinates and in turn produces a colorless spore (Basidiospore, IV) that attacks a tree leaf. On the tree, sexual spores (Pycniospores O) may be produced which fuse and give rise to still another kind of spore (Aeciospore, I) which is capable of attacking an alternate host such as a grass plant. From this initial infection of the grass plant, still another spore type (Urediospore, II) is produced which continues repeated attacks on the grass plant until the plant matures and dies. Upon maturity the black spores are again formed. Any rust which has all of these spore types is known as a complete rust. Some have one or more of the spore types missing.

Although a rust fungus has many different spore types, the principle of infection is the same—the spore is carried to the leaf surface and in the presence of of moisture and suitable temperatures the spore germinates causing infection. The initial source of spores in the spring is usually from the alternate host. Among the deciduous shade trees the most prominent rust diseases are on hawthorne and flowering crab, although ash and poplar sometimes become heavily rusted too. The alternate host for hawthorne and flowering crab is not a grass plant but juniper or red cedar and is prominently manifested on these species by the production of the colorful cedar-apple-galls.

Control of rusts: The best way to control the rusts would be to eliminate the alternate host but this is usually not convenient nor practical. They can be controlled effectively on trees through protective spraying, that is, spraying before the leaves become contaminated with rust spores. In the case of hawthorne and flowering carb, as soon as the new leaves have unfolded in the spring, spray 2 to 3 times at two week intervals with Zineb 65% WP (1½ lbs. per 100 gallons of spray).

WHY LEAF DISEASES ARE NOT MORE SERIOUS

You may wonder why leaf diseases are not more serious. I assure you they could be devastating and, I assure you again, if one does become devastating it will be because of man.

Nature exists in an intricate network of checks and balances. Diseases are one

(Continued on Page 18)

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Is Tree Spraying Harmful to Birds?

By Joseph A. Dietrich,

Supt. of Parks
Greenwich, Connecticut

Paper presented at NAA Meeting in Detroit, Mich., Aug. 18, 1959

In a national controversy involving the use of pesticides for insect and plant disease control, public shade trees, agricultural and forest products, as well as general public recreation are receiving a great set back. Of great concern to me also is the severe interference with the Dutch Elm Disease control programs for our nation's elm trees. Commercial arborists, city foresters and public officials generally are finding themselves in the middle of this battle. The conservationist, ornithologist, some scientists and garden club membership are engaged in a wide scale program for the elimination or curtailment of spraying programs because of wild life, fish and bird damage, as preached to them by scare programs and misinformed sources. This in turn has scared many reliable and conscientious city officials and commercial tree men who are charged with responsibilities of insect and disease control to a point of least resistance. Reliable and thoroughly tested chemicals which have performed a remarkable job in the general interest of mankind are being shunned as the result of this unwarranted, contradictory and needless propaganda. Widespread outbreaks of insects and plant diseases are occurring as the result of this situation.

How many brave town or city officials, city foresters, or tree men are there who can afford to stand the pressure of criticism by their clients or taxpayers in the use of these newer and more effective spray materials?

The most cussed and discussed material is the best of our weapons, and one that our scientists and agricultural chemists know the most about, DDT. One of the chlorinated, hydrocarbons so dramatically advanced to the world as an insecticide in 1939, and used so successfully by the Armed Forces in World War II, especially in control of the Typhus louse. I seriously believe that there has been more research, more technical papers written and more actual words spoken on this one chemical than any other material on the market.

Organizations and individuals condemning the use of pesticides, select DDT as the target of their opposition in the majority of cases. Widespread derogatory publicity, has found its way into group meetings, home reading matter, radio and television mediums to such a degree that the mere mention of the word "spray" is cause for hysteria.

Practically every human ailment, including cancer, heart trouble, nervous disorders, etc., have been blamed on some phase of chemical spraying and specifically DDT.

Unsprayed areas adjacent to town roads have a high degree of disease as can be noted by the dead branches in this picture.

To meet the record on a more even level, I think it extremely important, at this point, to observe that the actual individuals performing the necessary services of insect and disease control work are not murderers, not unscrupulous or unreliable personalities, and if the truth were known, they despise the job of spraying more than any other activity in their tree and plant maintenance operation. It will also be revealed that they are lovers of birds and wild life and in many instances staunch supporters of all phases of conservation work. A copy of the Audubon Magazine is usually in their magazine rack. I, personally, find it quite helpful in my type of city work, and I might say that I am on the Board of Directors of the Junior Audubon Society. Observing the situation from this angle makes it a little clearer why those responsible for this phase of control work are disturbed and at the one-sided tarnished criticism of our spraying programs.

Let it also be part of the record that the efforts and conclusions are arrived at by close association with the scientist, the Agricultural Experiment Stations and many other government agencies close to this field of endeavor. Agricultural and the allied sciences are not new fields of operation and years of experience and research have gone into this work.

Serious concern should be shown by this group and also others concerned with the problems we face in the destructive activities of the insects and diseases of our civilization today. Of even greater concern is the need for education of the uninformed, misguided individuals who are presently victimized by the opponents of our efforts. I gather from an article, "Pesticides Can Be Used Safely," by Joseph F. Spears, Chief Staff Officer, Plant Control Division, U.S.D.A. "The chemical age in agriculture is just beginning. To the farmer the development of effective chemicals to control some of the 10,000 varieties of injurious insects has been one of the greatest technological advances in agriculture.

"A major scientific breakthrough came as a result of stimulated research during World War II. An entirely new category of insecticides, such as DDT, came into being. Crop losses caused by pests were dramatically reduced. Within five years after DDT was introduced into everyday use yields of many crops jumped from 10 to 20%. Public health officials hailed DDT as one of the greatest health discoveries of this age. During the first ten years of its use DDT was credited with saving five million lives and preventing more than 100 million cases of illness from malaria and related insect-borne diseases.

"Despite these facts, some segments of the public are telling the American people that these insecticides are endangering our health, destroying beneficial forms of life, and upsetting the balance of nature. Let's take a look at what is being done to protect the public, and the safety record of pesticidies.

"Agricultural chemicals are regulated by two Federal laws and by laws and regulations in nearly every state in the Union. The Federal Insecticide, Fungicide, and Rodenticide Act of 1947 is administered by the U. S. Department of Agriculture. This act requires manufacturers to prove that a pesticidal chemical is effective against destructive pests and requires labeling of the chemical to show which pests the chemical will control, the crops on which it can be used, how the material is to be applied and a warning or caution statements concerning any hazards that may be involved in handling or using the material. The Miller Pesticide Residue Amendment to the Fed-

eral Food, Drug and Cosmetic Act was signed into law in 1954. It is administered by the Food and Drug Administration of the U. S. Health, Education and Welfare Department. This law requires the thorough testing of any pesticidal chemical before it can be used on a food or feed crop. From this date the Food and Drug Administration establishes a tolerance on the maximum amount of the residue of the chemical which legally may remain in or on a food crop when it enters interstate commerce. This level is set at or below that calculated to be safe for humans. Federal laws thus require scientific and tested proof of the safety of agricultural chemicals before they can be sold for use in foods and, further, places definite restrictions on their use in order to safeguard the public."

Pesticides Valuable

Pesticides have proven their value as modern, effective tools for controlling pests. Rather than deny farmers, public health officials, agricultural workers and others the use of pesticides, we prefer to encourage wise and judicious use of these materials so that we may all enjoy the benefits that they provide.

Commercial tree men, city foresters, and Park Executives charged with a responsibility to the taxpayer, general public or clients are not only in the center of this controversy, but also are faced with a situation whereby they find it extremely difficult to do their job.

The citizen today is a lover of outdoor living — the backyard, park areas or woodland is his source of retirement from the pressures of the high tension world in which he lives. His concern is to obtain the maximum recreation and tranquility available. He also is an admirer of beauty—his rose garden, lawn or perennial garden are his pride and joy. The first tomato or red apple from his own property becomes a subject of considerable conversation. The neighborhood he lives in is a great concern to him, the city park, playground or line of street trees that decorate his environment are very much his business. This group of citizens make up the people we do business with, and whom we must satisfy from day to day.

Mrs. Jones wants her fruit trees sprayed because bugs are eating all the leaves. Mr. Jones is embarrassed because large sections of his lawn are dying out and he wants it sprayed. Miss Jones is entertaining a group of friends for a cookout and wants no flies nor mosquitoes to molest them.

Street trees or flower beds in parks are victims of insect invasion necessitating a phone call by a citizen to the city official for corrective action. Faced with this demand for services the tree or city officials prepare themselves with corrective measures based on years of experience, and

(Continued on Page 19)

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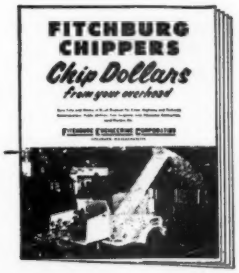

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LEAF DISEASES

(Continued from Page 14)

of the many check valves within Nature as a whole. I do not have the time here to fully explain the intricacies of this complex network. But let me put it this way: Nature's stability is because of her diversity. If you take all the seeds of an elm tree and plant them and then observed every single tree each seed produced you would find no two trees exactly alike. This diversity is absolutely necessary because thousands of falling seeds from a tree in undisturbed Nature are going to meet thousands of different environmental situations. In order that one seed of a tree might fall into an environmental niche that would permit it to grow and reproduce, may require a million or more tries—hence in its lifetime it produces a million or more seeds, each one having slightly different inherent capacity from the other.

Because of this great diversity within a species no one single factor such as disease will wipe out a species in undisturbed Nature. In undisturbed Nature a fungus may vigorously attack one elm tree but not the neighboring elm. In fact, the disease may kill a number of elms but the remaining resistant elms will continue to hybridize and transgress from the danger. The fungus, too, can hybridize and form new virulent forms. This is but one example of the tremendous array of checks and balances in Nature and because of this constant inherent variability no species is ever really lost but may continually transgress to new forms.

MAN—DANGER!!

Now, when man steps in, he tends to unify. He may like to have a whole avenue having exactly one type of tree. This he can do by grafting. This is extremely hazardous because Nature can retaliate dramatically and destructively against uniformity. If one virulent leaf disease hits one tree, it can hit all the trees. The epidemic that can occur is way out of proportion as to what could ever begin to occur in undisturbed Nature. Every leaf could be stripped from every tree leaving a hideously naked row of trees in midsumer, leaving the people to be sun drenched by the merciless summer sun rather than cooled by heavily foliated trees.

I point this out as the gamble we take when we attempt to perfect Nature for us through unification. It should not deter us in our striving to utilize Nature for beauty and comfort. But let us first know what we are doing so as to best avoid the disastrous pitfalls created by Nature.

In final, I would like to say this. If we do not have any greater leaf disease problems in the next 100 years than in the past 100 years, I will say that man will have been very wise in his breeding, and selection of shade trees.

Professor Loyal F. Payne, member of the Kansas State Poultry Dept., has a garden in which all the plants have names connected with bird life; Bird of Paradise, Turkey Foot, Cox Comb, Chickpea, Pheasant Eye, and chrysanthemums in the swallow and golden cocatoo varieties. He has tried 35 plants and has a list of 125 other possibilities.

* * * *

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TREE SPRAYING

(Continued from Page 17)

the latest recommendations of Federal and State agencies, Scientists and they tackle the job with the best of modern equipment designed for the job at hand.

To emphasize more strongly the situation facing the public at present on the matter of the use of chemical insecticides, I reluctantly must cite some of the incidents which create this problem and will continue to do so until some effort is made to counteract it.

In Wisconsin, a prominent woman conservationist and Audubon member, saw fit to organize a committee condemning and criticizing the use of chemical spraying based on reports she had obtained indicating damage to birds, wild life and man. She calls the committee "The Committee of A Thousand" and claims a membership of 60,000 in Wisconsin. Her criticism and articles are severe and hysterical and when produced on her stationery, which is framed with a skull and cross bones and dead birds filling in the background it makes a dramatic letterhead.

I will not venture into her voluminous written material, but in order to illustrate the basic theme of this campaign, I would like to read you the list of recommendations being mailed out to Garden Clubs and other sources throughout the country.

RECOMMENDATIONS
(From Committee of a Thousand)
—DDT Spraying and Bird Mortality—

1. Stop planting elm trees until Dutch Elm Disease is under control.
2. Provide a single annual spraying while trees are dormant, without foliage, and bark coverage can be most effective.
3. Confine DDT spraying to the period from November 15 thru April 1, by using the new dormant spray method (thereby avoiding the periods of heavy spring and fall bird migration as well as of nesting.)
4. Use only mist blower equipment and not hydraulic equipment, to minimize dripping that contaminates pools and puddles where birds drink and bathe.
5. Stress sanitation. Remove dying elms immediately. When weather is too cold for spraying, assign more men to remove dead and dying wood from elms.
6. Make sure that the State Department of Agriculture Law is enforced, which states that dead and dying elms must be removed within 10 days.
7. Enact a city ordinance prohibiting private operators from spraying trees with DDT or other sprays destructive to bird life between April 1 and November 15.

This, gentlemen, is a small example of the type of information being fed to the public. It takes no imagination to see that the chief phase of conservation this group is interested in is—birds alone. Little concern is indicated for the home owners valuable shade trees, or orchard and not even the home garden seems to be a consideration. What happens to the commercial food producer, or the forest and woodland pestered with insects and disease and which serves to house, feed and protect the bird life seems to be of no concern.

To stop planting elms, as recommended, would be the quickets way to eliminate this valuable tree from our roadsides. To enact ordinances to stop spraying between the period of April 1 thru November 15 would certainly create a situation for the tree man faced with protecting his clients, shrubs and orchards.

No Birds In Batavia?

I could quote further on her condemnation of U.S.D.A. scientists and other conscientious and reliable people of this group, and I would refer to Dr. Cynthia Westcott, one of our Shade Tree Conference members and author and lecturer of note as one of those criticized for her failure to agree with the tactics of these people. In correspondence addressed to me from which I quote, Dr. Westcott says "Recently I had a letter from the Animal Protective League, the President living in Milwaukee. This stated that there was 80 to 100% mortality of birds from DDT spraying and that there were no more birds in Batavia, Illinois. I immediately wrote to the Illinois Natural History Survey and asked for facts. They are concerned enough about the effect of such a report that they have sent someone to make a bird survey in that area." The results of that survey are shown in the following article published by Dr. Westcott.

"Deeply disturbed by a letter from the Animal Protective League stating that a DDT spray of one pound per acre caused eighty to one hundred per cent destruction of birds and wildlife and that 'in Batavia, Illinois, there are NO MORE BIRDS,' I sought confirmation. The DDT dosage proved to be a printing error. I have not yet had evidence of appreciable hazards to birds at low dosage; above two pounds per acre there is some danger.

"There are still birds in Batavia. A special bird census has just been taken in that area by the Illinois Natural History Survey. Dr. Harlow B. Mills, Chief of the Division, has sent me the following data:

"On August 15, 1957, there were four birds per acre in Batavia with 16 species represented. The general average of birds in communities in the Fox River Valley where spraying had been done for the

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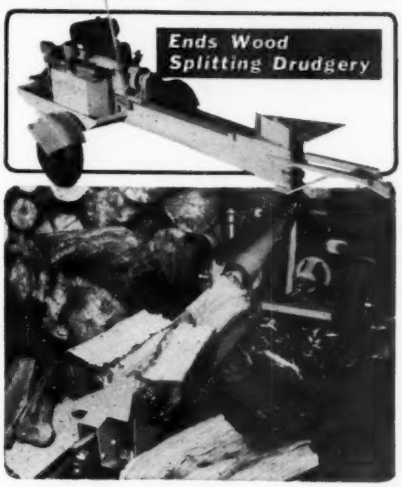

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Dutch Elm Disease was 3.6 per acre compared with an average of 4.8 in towns where no spraying was done. But this trend was reversed in another section; sprayed Princeton had six birds per acre and unsprayed Mendota had 4.8. There are many variables which might affect exact figures but at least we can conclude that even the relatively large amount of DDT used to control the Dutch elm disease vector has not decimated the bird population in Illinois."

In addition, in her letter to me Dr. Westcott indicated that the Chairman of Legislation for National Council of State Garden Clubs (also from Wisconsin) said she was being beseiged with people wanting legislation against use of poisons.

The Committee of A Thousand chairman in writing to Dr. Westcott said, "We hope garden clubs throughout our nation will join our crusade against poison sprays killing our wildlife, sprayed on our food and doing great damage to our citizens everywhere."

A further article delivered for public consumation and more specifically for the convention of the National Audubon Society by Dr. George J. Wallace in 1958 was concerned about the drop in the robin population at Michigan State University as a result of spraying elms for control of the Dutch elm disease. In a dramatic conclusion to his article he states:

"The current widespread and ever expanding pesticide program poses the greatest threat that animal life in North America has ever faced—worse than market hunting and illegal shooting, worse than drainage, drought or soil pollution and possibly worse than all these decimating factors combined.

"The present ill-conceived and ineptly executed fire-ant eradication program will go down in history as one of the most biological blunders that man has ever made.

"If this and other pest eradication programs are carried out as now projected, we shall have been witnesses within a single decade to a greater extermination of animal life than in all the previous years of man's history on earth, if not since glaciation profoundly altered the life of the whole Northern Hemisphere."

Very dramatic and exciting statements. The question that arose in my mind after reading this masterpiece was that perhaps the students, professors and residents of the area had a greater desire for the beauty, shade and general aesthetic picture afforded by the elms than they did for the short term serenade of the Robin who probably has all intentions of setting up housekeeping somewhere else for a change. In reply to correspondence with Morris D. Blackburn, Professor of Entomology at Pennsylvania State University he writes:

"Many of the recent newspaper and magazine articles concerning the possible detrimental effects of insecticides on wildlife are highly emotional, and frequently give only the partial facts which leave disturbing doubts in the mind of the public. Statements linking certain insecticides, such as DDT, with various human diseases are indeed unfortunate unless they are substantiated by adequate experimental evidence which thus far has been lacking. Entomologists would be among the first to agree that the effects of modern insecticides on wildlife and humans deserve continuous investigation, but they would also be the first to demand that all statements regarding such effects should be based upon sound, experimental data."

The stationery framing of "The Committee of A Thousand" featuring a skull and dead birds in the background.

Without a doubt, the use of DDT has been a dramatic one for those in the field of insect control work. In thumbing through endless papers, articles, texts and printed matter, I feel that here is one material that has had the scrutiny of many leading scientists in the world. No one indicates that it is not a poison any more than they do other chemicals used for similar purposes. Rules and precautions are part of its use. It might well be said that you can live with DDT but not with lead arsenate, one of our previously, heavily used insecticides.

Experiences in the use of DDT have been many and varied and in my own case I might state that without the benefits of this material my job would have had more miseries and our elm population (of which we are so proud) would have been a thing of the past. Thirteen years of DDT spraying in Greenwich never produced the dramatic catastrophies portrayed by some of the critics mentioned. Birds still migrate and sing and nest in our city and park elms. Fish still populate the streams and lakes of our park lands. Wild life is still active. Personnel engaged in spray operations in which drenched clothing with DDT spray is quite common, still operate our equipment for eight to 10 hours night and day two to three months of the year with no ill effects. The attitude of our chief entomologist of the Connecticut Agricultural Experiment Station, is contained in his letter to me in which he says, "There seems to be no hazard whatever to the health of the public in spraying street and park trees for insect control. If humans are as susceptible to DDT as rabbits (the most susceptible test animal), it would require one and one-half *pounds* of DDT each to kill half of a group of people weighing 100 pounds each. Two and a half *pounds* each would be expected to kill half of the people weighing 150 pounds each. In terms of DDT emulsion usually used in spraying trees, this would be the DDT in about two and a half and four *gallons* of DDT emulsion.

"We have watched the relation between bark beetle sprays and birds here in Connecticut and have seen no evidence of death of any birds. I cannot believe that sprays here have caused the casualties reported from Illinois. Therefore, there must be some fundamental differences either in the sprays or the birds in the two locations. In one park in New Haven, earthworms contain a fairly large amount of DDT. In another apparently receiving identical treatment, there is little DDT in the earthworms. Possibly one major difference is the number of treatments of the foliage. The Illinois treatments included 'several' foliage sprays.

"Economic entomologists have always sought remedies other than spraying for control of pests. In the case of Dutch elm disease, the most practical remedy would be either inexpensive chemotherapy or use of resistant strains. We are working actively on chemotherapy, as you know. Dr. Doane has been studying the possibility of controlling bark beetles by use of bacteria of fungi, and has already published his results. The purpose of these investigations is not just to avoid spraying which might affect wildlife, but the development of much less expensive ways to live with insects.

"I see no more logic in eliminating all present spraying operations to avoid any hazard to people, wildlife, etc., than I do to eliminating all automobiles to solve the problem of traffic injuries and fatalities. I see nothing morally wrong or scientifically contradictory in preserving the beauty of a tree by spraying rather than letting the insects ruin its appearance."

"In the long pull, it is our job to provide proper control measures for insects.

(Continued on Page 22)

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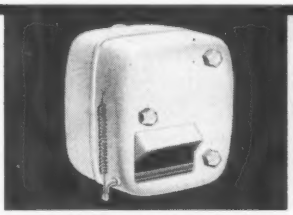

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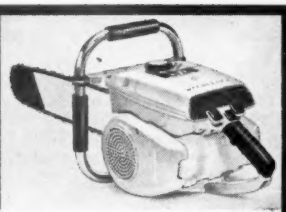

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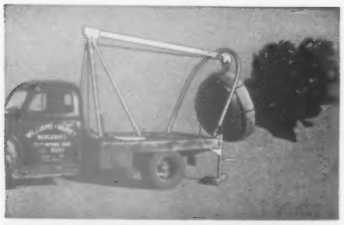

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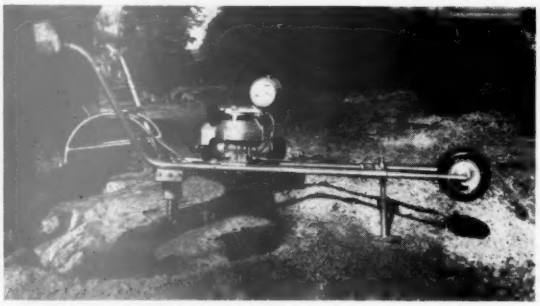

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We will continue to search for control measures that reduce the hazards to wildlife in those cases where present materials and methods seem to be really hazardous. Unfortunately, you can never prove a spray innocent. In most matters the accused is assumed to be innocent until proved guilty. In most cases we think the sprays and sprayers are innocent, and guilt must be proved."

False Reports

Several weeks prior to this talk, I had a phone call from one of our neighborhoods by a very upset citizen claiming the Town had killed blue jays in her yard by spraying Town trees. Since our spray rigs had not been in use for a month this seemed difficult to believe. Upon investigating it was discovered that there were no elm trees in the area, so no spraying had been done. Further investigation revealed that the birds had been electrocuted by high tension wires. This neighbor had contacted home owners in the vicinity to protest any future spraying because birds were killed.

Another incident which points out why false reports become mountainous headlines, was a report of dead ducks in one of our park lakes. A citizen called the newspaper and reported the ducks were all being killed by spraying which was contaminating the lake water. The lake in question was a tidal lake and refuse from boats, which included surplus food items, also dead fish and eels discarded by fishermen drifted into the pond and was deposited on lake banks. Ducks feed on such material and laboratory analysis by a state laboratory indicated that the kill was from a disease called Botulism, quite common from such causes. No spraying of the lake had been done, yet citizens generally reading the paper were up in arms by false reports from an uninformed citizen.

The general public is constantly reading such information and are geared to a state of hysteria, when such events take place. I wrote to the Agricultural Research Service, Plant Pest Control, U.S.D.A., on this subject and Mr. D. R. Shepherd replied and commented as follows: "Opposing the use of pesticides has become a popular subject in recent months. Much of the criticism is coming from individuals not fully acquainted with the need for insecticides to protect our agricultural industry and to preserve our natural resources. It is unfortunate that many of the articles which are critical of pest control programs tell only a part of the full and true story. Most of them dramatize the relatively few instances where wildlife has been affected by a pest control program. Rarely do these articles go on to consider the thousands of acres which have been treated without adverse effects.

"Tremendous advances have been made in the field of biological control of pests

and diseases. Milky spore disease has successfully controlled Japanese beetle infestations, wilt diseases have been moderately successful in reducing populations of gypsy moth and other lepiodpterous insects. Predatory insects, such as the lady bird beetle, are frequently cited as outstanding examples of biological insect control. Despite the successes in biological control, explosive infestations occur, making it necessary to use insecticides to restore the balance between the pest and its biological checks. We can see little or no possibility in the near future that chemical control will be abandoned.

"We believe it impossible to produce our basic food and feed crops without protection from insects and diseases. The American public will not tolerate the health hazard created by mosquitoes and flies, the devastation of crops, the contamination of stored food or the destruction of forest and shade trees by insects and plant diseases. Rather than abandon present pest control practices we prefer to encourage wise and judicious use of pesticides and continue to enjoy the benefits they provide."

The Handbook of Toxicology on insecticides prepared by the Division of Biology and Agriculture, the National Academy of Science, The National Research Council devotes a great deal of printed matter to DDT including a wide range of test results. Under the heading of Toxicity for higher animals, it states that DDT is toxic, for higher animals (as well as for many lower organisms other than insects), but that with appropriate understanding and precautions, the hazard is low. The toxicity is less than that of such substance as sodium, fluoride, paris green and nicotine long used successfully in house and field.

The oral dose to produce illness in some human subjects is: 10mg/K. The known dosage consumed without fatality in one case was 285 mg/K. The estimated oral L.D. for man: 500 mg/K with death in 2 - 24 hours.

The least daily repeated dose to produce illness is unknown. Dogs will tolerate 10 mg/K per day for years without effect.

In references published by the Industrial Research Service by authors, O. T. Zimmerman, Professor of Chemical Engineering at University of New Hampshire and Irvin Larvine, also a chemical engineer, the toxicity picture is indicated as follows:

"If we assume that dogs, cats and other animals react in the same way to DDT as does man, we can get some idea. Let's start out with rats which seem to resemble man rather closely in their reactions to various disease organisms and poisons. Out of hundreds of experiments let's take a typical one. A number of rats were given a total of 1.2 grams of DDT in 1/5 gram doses per day over a six-day period and then were watched for six months to see if they would exhibit signs of poisoning. They did not. In all respects they appeared perfectly normal. Now, these rats weighed an average of 300 grams each or 2/3 of a pound. If a man could tolerate the same dosage in proportion to his weight, a 150 lb. man could take 120 grams, or more than ¼ pound of DDT over a period of six days without any ill effects. Or to put it another way, he could eat over 2½ pounds of a 10% DDT dust."

Aerial spraying for the control of the Gypsy Moth and other destructive insects has come in for its share of criticism and controversy as well.

It is interesting to note that the Commonwealth of Massachusetts, Department of Natural Resources, has been engaged in an aerial spraying program from 1948 through 1958. Included in this spraying was an 8,000-acre plot on Cape Cod. Charles S. Hood, Bureau Chief, writes me to state that—"the Commonwealth has sprayed approximately 3,000,000 acres for the control of Gypsy Moth. Canker Worm and Pine Loper. DDT has been used at rates, varying from one-half pound per acre up to a maximum of one pound per acre. The formulation most commonly used has been a 9% solution."

Jack Kenealy of the Lower Merion Township, Shade Tree Commission of Ardmore, Pennsylvania, has sent me a copy of a report he made on community spraying of some 7,000 acres. He pointed out that because of the natural beauty of the country, estates and large suburban homes predominated the countryside. Mr. Kenealy stated that "he was hopeful for a seventy per cent control and this would have satisfied us. As near as we can determine, however, we realized better than 90% control. Careful daily checks were made at previously designated areas to determine the percentage of kill to a known population, damage to beneficial insects, birds and wild life including fish. Up to the present time, eight months later, we have found no measurable damage."

Massachusetts is still quite alive and active after ten years or more of aerial DDT spraying and has saved endless stands of trees which would otherwise have been destroyed by attacking insects. Fish and birds still make their homes in this New England state and are probably blessing the work that preserved their nesting areas and food supply. I would like to hereby mention: The now famous court case heard in Long Island in 1957 involving 14 plaintiffs to restrain the Secretary of the U.S.D.A. and the State Commissioner of Agriculture and Markets from committing trespasses upon their lands by means of low-flying planes and spraying their lands with DDT and

(Continued on Next Page)

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to prevent future aerial sraying of their lands with insecticides.

The decision handed down by Judge Bruchhausen (1958) stated:

"The plaintiffs have not sustained their claim that spraying causes any considerable loss of birds, fish, bees and insects. Only a few fish and birds were killed in the subject area. Furthermore evidence of spraying programs throughout the country demonstrates also that the fish, bird and bee loss has been inconsequential."

It should be apparent to each of the commercial arborists, city foresters and all others gathered here and concerned with the insect and disease problem facing us that some concerted action is necessary to take us off the hook and to equip ourselves with weapons of defense in the dealings with our customers and the general public.

We in the profession have not been entirely faultless in this situation. The careless operator fills the street gutters with puddles of DDT, causing bird kill, the enthusiastic salesman of pesticides without proper knowledge of his product, the uninformed arborist utilizing products unfamiliar to himself or personnel, all have contributed incidents and occasions for the glaring headlines that now face us.

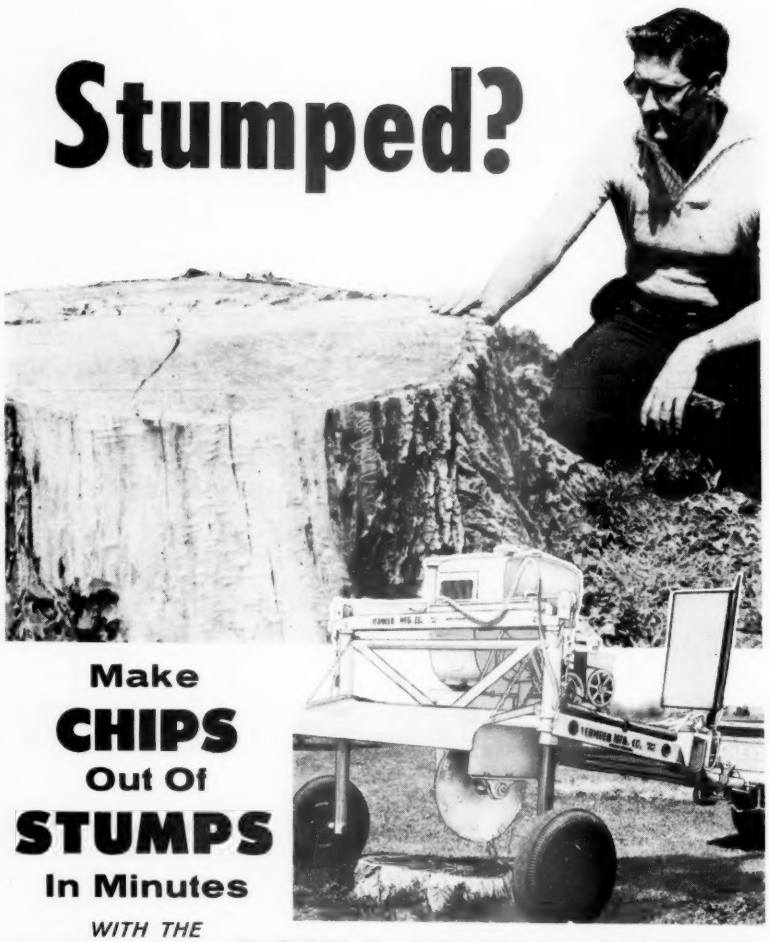
Inform the People

In concluding this article I feel that there are certain suggestions or recommendations that might help in solving this dilemmna. Since people are the ones we deal with it is therefore necessary that these people be informed about the work that we perform. We should include as part of the tools of our trade recommendations so readily obtainable to us from our scientists, Agricultural Departments, Experiments Stations and other reliable sources. We should also police, reorganize and modernize our organization to deal with the present-day criticisms of our operations.

The experts, schools and agencies should make information detailed and in language readily understandable to the layman. A doctor ordinarily does not permit the patient to diagnose or prescribe the corrective medicine for an ailment. The tree man should not permit his client to dictate the corrective spray to be used on the trees which he is to care for.

On a larger scale it would seem wise for a more cooperative effort to be established between many agencies dealing with insect and disease control work, such as conservation groups, health agencies, fish and game authorities and the U.S.D.A., to mention a few. Certainly a report or series of recommendations which would have the support of such a group would meet with great approval from the general public and would improve the relationship so necessary for this operation. A good example of what can be accomplished was the meeting of the World

Stumped?



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Wide Health Organization, the U. S. Public Health Service and the Food Protection Committee of the National Research Council and from this meeting came some very definite conclusions on the usage of pesticides.

I would further recommend that on the local level more effort be exerted by the Commercial Tree Men and City Foresters to cooperate with Audubon Groups, conservation people and Garden Clubs. Spray programs can be adjusted slightly when necessary and a little support to wild life and fish programs may pay off surprisingly well. As an example of this, a further reference is made to Jack Kenealy's program at Ardmore, Pennsylvania.

Jack consulted and worked with various agencies and individuals in his program, including the Scranton Audubon Society, Massachusetts Audubon Society, the American Audubon, the U.S.D.A., U. S. Wildlife Society, Dr. Clyde Hamilton of Rutgers University and others. His efforts paid off. I would also suggest that the efforts of the National Shade Tree Conference be put to work. In this organization are some of the best minds and talents in this field of operation. An existing committee, or a new one, if necessary, could turn its efforts toward coordinating information on pesticides and their use and work with the combined agencies mentioned above in disseminating such information to the membership.

Much remains to be lost as the result of the present controversy on the use of pesticides—still more can be gained by a concerted and cooperative effort on the part of not only the conservation and wildlife enthusiasts but all of us working toward the same goal, a world filled with the gifts of nature, food and forest products, but, free of the pests that tend to destroy it all.

THE TUMBLEBUG

(Continued from Page 10)

ranean countries. This insect has figured importantly in their art and religion for thousands of years. The ball, which the beetles were supposed to roll from sunrise to sunset, symbolized the earth; and the beetle, itself, the sun. As an emblem of eternity, it was placed in tombs with their dead and its image carved in stone and precious gems. Because it disappeared into the soil and afterwards reappeared, it stood for resurrection. Later, Roman soldiers wore scarab seals set in rings to bolster their courage.

One of the finest and most interesting descriptions of the habits of any animal was written about the sacred scarab by the great French naturalist, Jean Henri Fabre. Scarcely more than an inch long, this beetle shapes a hard compact ball which may be as large as a small apple or a man's fist. He showed that dung-burying beetles of many kinds and sizes play an important part in fertilizing the soil as well as in sanitation. In some places, enormous quantities of manure are buried promptly without being eaten. Fabre recorded an instance in which a dozen inch-long beetles of another kind each buried 60 cubic inches of manure night after night. This habit prevents the development of several manure-breeding flies and other pests.

The Scarab family of beetles, over the world, has thirty thousand known species. Their large sizes, bright colors, and unusual shapes make them favorites of amateur collectors. The males of many kinds have knobs or horns with which they butt and ram each other until one gives up.

Locally, the horseless carriage was the doom of the tumblebug.

(Nature Bulletin)

Beverly Hills, California has a new ordinance which prohibits planting or growing of vegetation around street trees, including the popular ivy and geraniums. The park superintendent is authorized to cut back such material.

* * * *

William B. Davis, 1959 winner of the American Institute of Landscape Architects' award for garden design, has been appointed extension landscape horticulturist at the University of California.

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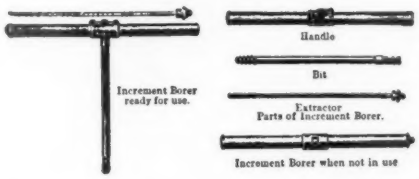

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Carpenter Ants

Cutting stovewood for home heating and cooking used to be a regular wintertime job. Then, when the trees are frozen solid, the work is easy. A large chunk of red oak, for example, pops wide open at a single stroke of the axe. Sometimes the fresh surface exposes a cluster of hibernating Carpenter Ants stiff and numb with cold inside a network of frost-lined tunnels. Warmed by the sun or the heat from a campfire they slowly begin to move their legs and feebly creep away.

In summer we see these carpenter ants prowling tree trunks and the forest floor in search of food. Occasionally, if we sit down on a fallen log or tap on a dead tree, dozens of them come rushing out with their antennae waving to see what is causing the disturbance. Less often, a colony is found enlarging its quarters. One ant after another runs out and drops a pellet of food onto a pile of sawdust on the ground below, then hurries back inside for another load.

This long-legged fast-moving black ant is the largest in our region and among the largest in the world. It or its many relatives, some with widely different habits, are found throughout the world in temperate and tropical climates. They are called social insects because they live in colonies in which there is a division of labor among the different members. The nests of our carpenter ant often look like ornate wood carvings with a maze of galleries polished as smooth as if they had been sandpapered. Termites, on the contrary, make channels which are cluttered with earthy material.

Usually, the colony is started in early summer by a young fertile queen which hides away in a crevice in a stump or injured place on a tree. There she lays a few eggs the size of pin points. These hatch into tiny larvae that grow into fat white grubs as they feed on her saliva, then change into pupae inside pale brown cocoons. From these cocoons small workers emerge which take over the grooming and feeding of their mother, the queen, the care of new broods of young and all of the housekeeping duties. From now on the queen merely lays eggs.

As the colony grows, assorted sizes of workers appear; all are sterile females. The smallest are ¼ inch long; the large "soldiers" are ½ inch in length. The queen is still larger, sometimes almost an inch, with a large head and bulging thorax kept highly polished by the constant licking and stroking by the workers. After the second or third year, young males and females with wings appear in the colony. In late spring these take flight and mate. The males soon die, the young queens shed their wings, then settle down to start new colonies.

Although carpenter ants bore holes in wood, either softened by decay or solid, unlike termites they do not eat wood. Like many other ants they coax honeydew from aphids, the so-called "ant cows." They also eat insects, live or dead.

Some of the interesting habits of these creatures can be studied by putting a dozen or two of these ants and some wood from their nest into a wide-mouthed jar closed with a piece of cloth and a rubber band. After they have quieted down for a few days, this can be connected by a glass or rubber tube with a smaller bottle or glass-topped box in which they are fed sugar water, dead insects, bits of cooked meat or boiled egg. Ants are blind to red so they can be watched undisturbed by a flashlight covered with red cellophane.

A faint rustling in the walls of a house or rustic log cabin is sometimes due to the chewing colony of carpenter ants. Telephone poles, porch posts and the framework of buildings in contact with the soil are most often attacked. They are easily controlled with paint, creosote or insecticides.

Because they are so big, some people call them uncles.

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BOOK REVIEWS

(Additional reviews on Page 30)

THE HIGHWAY AND THE LANDSCAPE, Edited by W. Brewster Snow, Rutgers University Press, New Brunswick, N. J. 230 pgs., illus. $5.00.

The largest highway building program in history is beginning to get under way in the United States. The public expenditure to implement this program over the next decade or two will amount to more than $100 billion dollars.

The way in which this huge sum of money is spent will leave a permanent impression upon American cities, suburbs, and rural areas.

This book, the first of its kind, discusses the principles that will determine the success or failure of this enormous road building program. Basic to road construction today is the conception of the Complete Highway, which takes into account not only the actual road but its setting and its impact upon communities and rural areas. As one of the contributors to this volume puts it: "Highway economy now is understood to consist, not in constructing the greatest length of pavement at the least capital cost, but rather in creating a public utility that possesses a total and permanent community value." Planners have learned over the years that the safest and most efficient highways are also the best looking. The graceful curves and the generous width and the careful landscaping of the new parkways might appear wasteful luxury when land is at a premium and construction costs high. The highway planners know better.

Taking the position that the highmway is a public structure, the authors of *The Highway and the Landscape* discuss what the highway can and should do, not only for the motorist but also for the community, the relationship between highway building and the pattern of future land use in the United States, and the problems of conserving our natural scenic heritage. They show why and how the best highways fit the landscape, why wide rights-of-way and properly placed trees and shrubs are economical, and why property values near a well-designed new parkway go up instead of down.

Many battles, some of them political, remain to be won if our new highway system is to be a valuable and long-lasting national asset, fit to serve the American way of life. In the words of the editor, W. Brewster Snow, "We stand at a critical juncture in highway building in the United States." The highway "must have both beauty and strength if we are to pass it along to subsequent generations." By the application of principles set forth as long ago as 1944 by the President's National Interregional Highway Committee, "these new arterial ways may be made—not the unsightly and obstructive gashes feared by some—but rather elongated parks bringing to the inner city a welcome addition of beauty, grace, and green open space."

The contributors to this volume are experts and national authorities in their fields. What they have to say is of interest and importance to many civic groups, all taxpayers, and every motorist. If the new highways are not wisely planned, the damage to the American future will be almost irreparable. If the program is developed with wisdom and taste, our national heritage will be vastly enriched.

* * * *

PRUNING MADE EASY by Edwin F. Steffek. Henry Holt and Company, 383 Madison Ave. New York 17, New York. 120 pgs., illus., $2.95.

Mr. Steffek is horticulture editor of Popular Gardening and has also collaborated on a number of books in the garden field. His easy to follow handbook explains pruning in simple steps and can be used by both the student and professional gardener.

This basic guide tells how, what and when to prune to increase flowering and fruiting or to remove injury or disease.

Included in the instructions are how to prune young trees, shrubs, evergreens, hedges, roses, small fruits, large trees, nut trees, dwarfs, grapes and vines. Check lists are provided with information about pruning various species.

* * * *

Kalamazoo, Michigan is preparing to add another block to its permanent downtown mall. The mall has sparked 20 remodeling projects and the establishment of a new $800,000 retail store.

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THE LAWN

(Continued from Page 7)

always plant food for both grass and tree. Again, frequency will vary with climate and soil; one should not force grass in the heat of summer, lush from excessive nitrogen. This is the road to disease and disaster, especially in the southern part of the bluegrass zone. But six feedings a year, monthly at half rate through summer, might be quite appropriate generally for lawns with trees. The fertilizers which release nitrogen slowly should be partciularly appropriate where frequent feeding is not possible.

Fortunately both bluegrass and fescue can stand drought well. They brown back, look temporarily devitalized, but revive almost overnight once cooler temperatures and moisture are again adequate. It is a matter of personal choice whether they are to be revived each time they start to wilt, by a slow deep sprinkling, or be let go dormant. On heavier soils a soaking will satisfy for a week or ten days, but sandy soils may need lighter watering oftener.

If the route of constant greenness is chosen, requiring regular watering, this too should be stepped up under trees. Trees may transpire, evaporate through the foliage, over 50 gallons of water per day in dry windy weather. The deeper tree roots suck water from the subsoil, so that replenishment from subsurface sources is disrupted for the grass. Watering should be sufficient to wet the soil all the way down to subsoil. In the heat of summer this may require 2 inches of water per week, at least in areas where trees abound. Consequently, in planning ahead, watering equipment should be capacious enough to spread this amount of moisture uniformly without too much trouble.

Weeds are always a threat, although more commonly in the sunny, open areas than under trees. Crabgrass, perhaps the most notorious weed, will not survive in shade, nor will bermudagrass in the South. If a few dandelions, plantains, ground ivy and similar broadleaf weeds gain a foothold, they can be smitten by the 2, 4-D family of chemicals. A combination that catches almost all broadleaf weeds is a 2, 4-D-silvex mixture.

With some of the grass pests the answer is not so simple. DSMA or AMA (the methyl arsonates) do a good job on sprouted crabgrass of sunny areas; or preemergence chemicals (Dacthal, Zytron, Chlordane, arsenates) can prevent its sprouting early in the season.

There is no good answer to perennial weed grasses, of which nimblewill *(Muhlenbergia schreberi)* is fast becoming one of the most serious pests. It thrives in the shade as well as the sun. Hand pulling, or overwhelming it with thick bluegrass-fescue is the best we can recommend at present. An alternative is to wipe out all vegetation with a general weed killer, then reseed.

This write-up can't go into details, nor cover all aspects of lawn care. Seldom are special gimmicks needed—such things as aerification, vertical thinning, "vitamin" sprays, growth stimulators, and such like. Tree leaves should be raked, or if not too voluminous might be pulverized with up-to-date rotary mowers equipped for this. Tests in Minnesota have shown that as much as two inches of pulverized leaves decompose on turf, without smothering grass, especially when supplied with extra nitrogen. Common sense will suggest the amount of leaves that can be left on the lawn for how long.

In summary, then, the Lawn Institute suggests the familiar recommended practices* for lawn establishment and care, intensified a bit under trees. Special consideration should be given to high mowing, and adequate watering if the lawn is not let go dormant. Do all possible in autumn to get bluegrass-fescue off to a good start, and the trees will reign monarch over an attractive compromise between forest and prairie, the luxurious park-like modern lawn.

* leaflets available from Lawn Institute, Route 4, Marysville, Ohio

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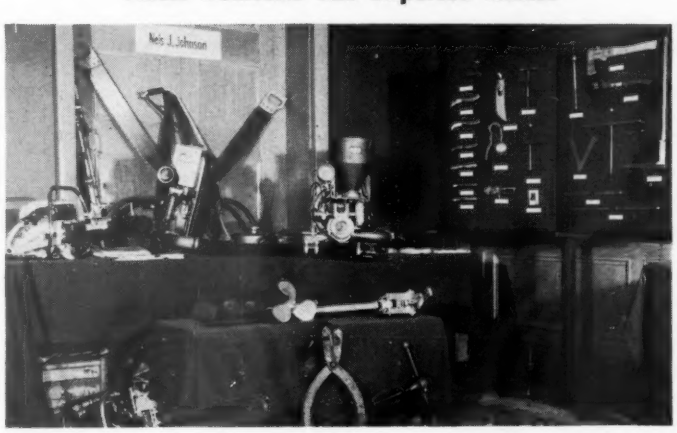

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Authors and Books

The books reviewed on this page may be ordered from TREES Magazine, 7621 Lewis Road, Olmsted Falls 38, Ohio.

DR. ROBERT W. SCHERY

Author of

"The Lawn Makes The Tree King"

Page 6

Dr. Robert W. Schery, director of the Lawn Institute, Marysville, Ohio is a nationally recognized turf authority.

In his post as institute director he prepares educational and technical materials on the proper seeding and maintenance of turf, and serves as liaison between the institute and the research and technical staffs of the college experimental stations.

Dr. Schery is a native of Missouri, having been reared in the St. Louis area. He was educated at Washington University and completed graduate work at the university and the Missouri Botanical Garden associated facilities, receiving his Ph.D in 1942.

He has traveled throughout the United States and in tropical America, is co-editor and part author of "The Flora of Panama"; author of, the book, "Plants for Man," which was published in 1952; and author of "The Lawn Book," which will be published by Macmillan, in November this year.

Dr. Shery has been a member of the teaching and research staff of Washington University, senior technician for the Rubber Development Corporation, lecturer at the University of Wisconsin, and botanist for the Monsanto Chemical Company and the O. M. Scott Company.

He is a member of the Botanical Society of America, American Institute of Biologicial Sciences, American Association for the Advancement of Science, American Society of Horticultural Science, American Society of Agronomy, Ecological Society of America, and is on the board of governors of the Nature Conservancy.

Most recently Dr. Schery supervised production of a lawn movie entitled "Beautiful Bluegrass" and completed a review of lawn seed production for the Technical Journal, *Economic Botany*.

DR. JOHN L. WEIHING

Author of

"Leaf Diseases of Shade Trees"

Page 12

Dr. John L. Weihing has been Extension Plant Pathologist for the University of Nebraska since 1950. During this time he has had numerous research and extension articles published. The paper reprinted here was presented at the Midwest Chapter of the NSTC. February 11, 1960, in Omaha, Nebraska.

Dr. Weihing is a native of Colorado and received his B.S. in Agronomy from Colorado State University in 1942. Following four years in the U. S. Army he attended the University of Nebraska and obtained a Master's Degree in Agronomy in 1949 and Ph.D. in Botany (Plant Pathology) in 1954.

JOSEPH A. DIETRICH,

Author of

"Is Tree Spraying Harmful To Birds?"

Page 16

Mr. Dietrich has been Superintendent of Parks and Trees in Greenwich, Conn. for the past 14 years. Prior to that he was an agronomist for the U. S. Engineers and also was employed by the New York Park Department.

Mr. Dierich received his landscape architectural training at Syracuse University and took an additional 2-year course conducted by the New York Botannical Garden. He was associated with his father's nursery for a time.

Mr. Dietrich is a past president of the Connecticut Tree Protective Association and past president of the New England Park Association.

MUNICIPAL STREET TREES. A Manual for Public Officials and Municipal Foresters. League of Wisconsin Municipalities. 30 East Johnson St., Madison 3, Wis. 58 pgs., $3.00.

This 8½"x11" mimeographed publication brings up to date, the advancements made in street tree thinking of recent years in respect to the evaluation of the space available for a tree. Also there are listed a number of the better new selections of trees that have been made specifically for street use.

The word "Forester" is considered a misnomer when applied to municipal street tree management. This work is entirely in the field of arboriculture, not forestry.

A workable street tree ordinance is presented on page 8.

Generally the booklet is a very worthwhile and progressive publication. One recommendation however could lead to lawsuits. It is suggested that trees over 12 feet be guyed with three wires to stakes in the ground. If this recommendation is for tree-lawn trees, it is bad. Some form of vertical support for trees of 4" or better, caliper, should be devised.

The billiography could have been more extensive and should have included the proceedings of the National Shade Tree Conference and the Street Tree and Utility Conference.

PHYSIOLOGY OF TREES by Paul J. Kramer and Theodore T. Kozlowski. McGraw-Hill Publications in the Botanical Sciences, 230 W. 42nd St., New York 36, New York. 642 pgs., illus., $12.50.

This volume represents the only up to date compilation of what is known about the physiology of tree growth. The authors, Paul J. Kramer, professor of botany, Duke University, and Theodore T. Kozlowski, professor of forestry, University of Wisconsin, wrote this for use as a text or reference for foresters, plant physiologists, horticulturists, botanists, arborists, teachers, students, and investigators.

Subject matter includes the structure and processes involved in tree growth, such as photosynthesis, respiration, nitrogen metabolism, translocation, accumulation, mineral nutrition, sexual and vegetative reproduction, seed germination and water relations. Two chapters are devoted to internal and environmental factors affecting tree growth.

Although the basic approach is ecological rather than biochemical, mechanisms of processes are briefly described. The authors evaluate divergent views in the literature and cite over 1700 references from worldwide literature. Most of the material in this text has been used in lecture notes for over 10 years. The chapters themselves have been tested at Duke University, the Yale School for Forestry, the University of Michigan, the University of Massachusetts and the University of Wisconsin.

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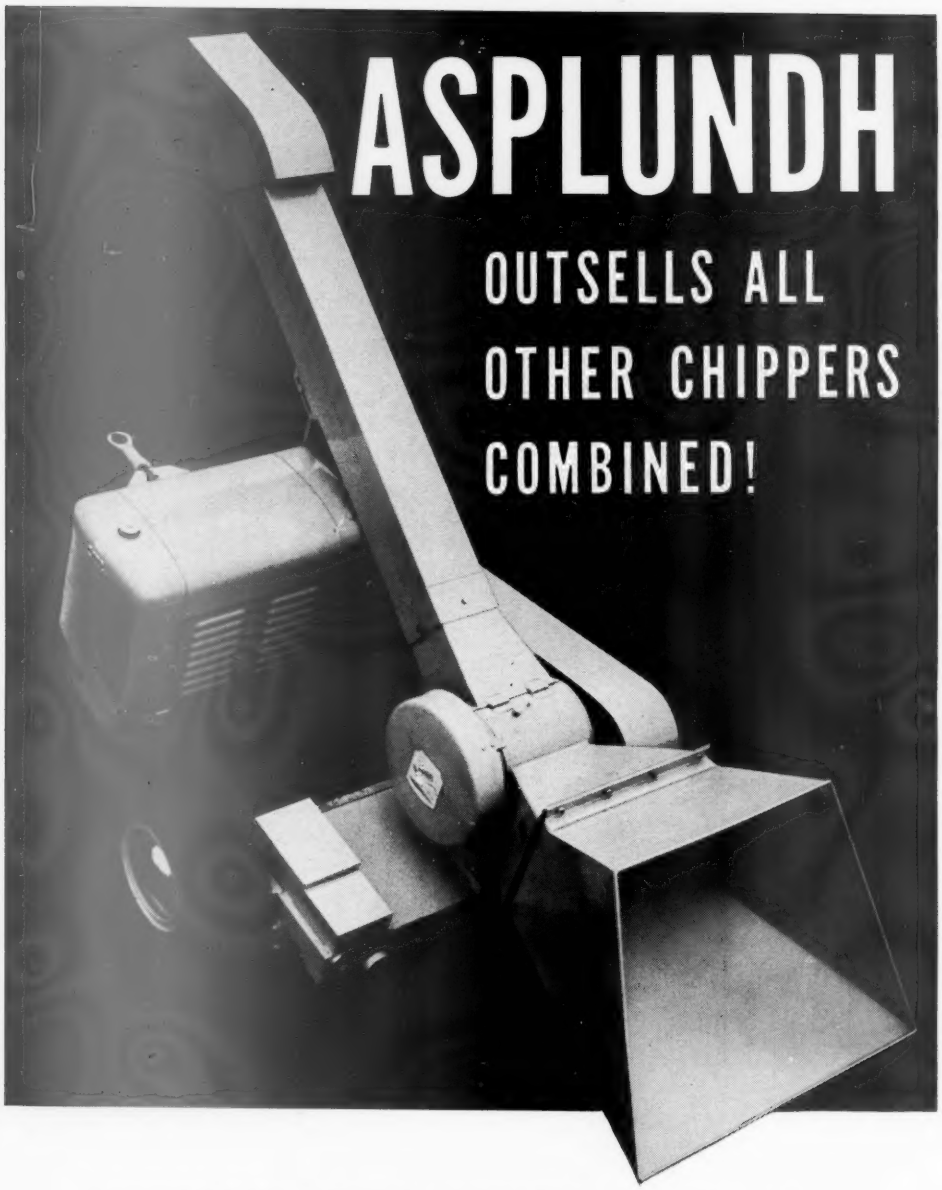

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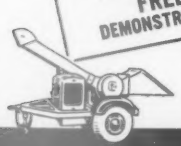

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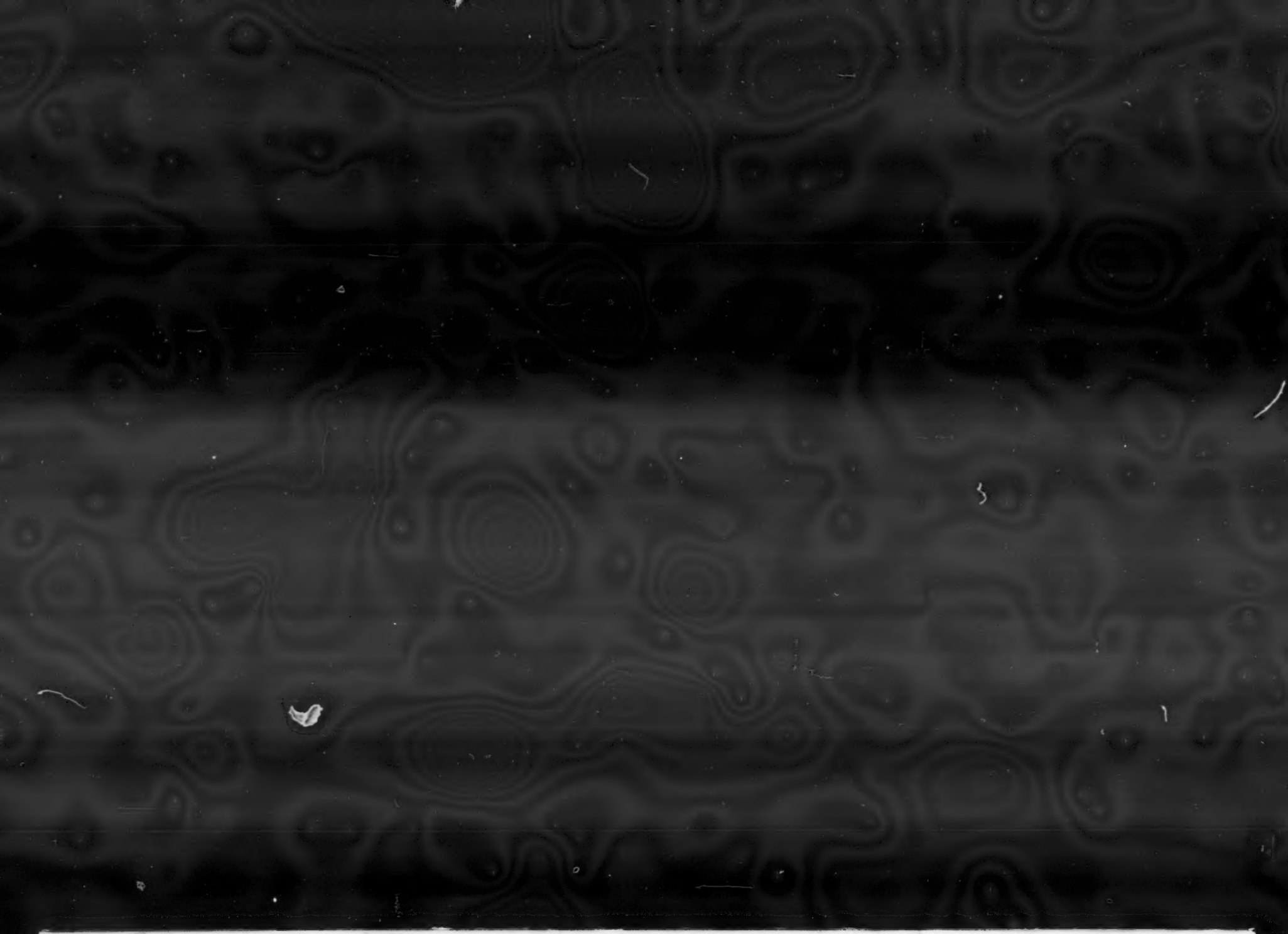
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